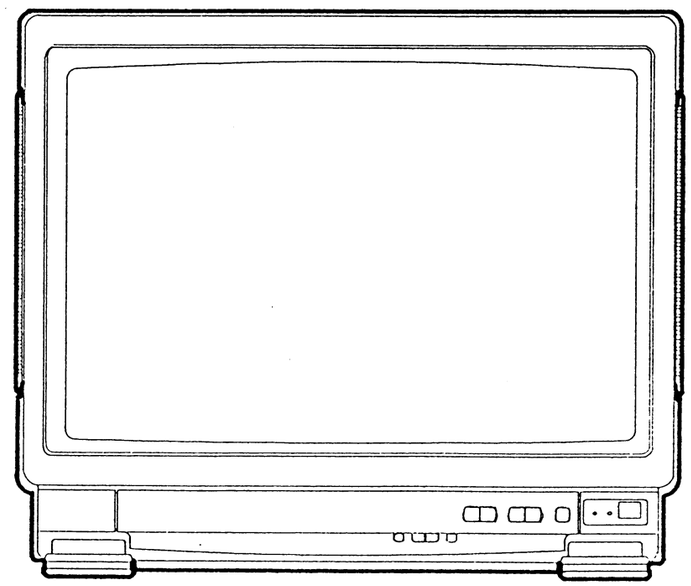
FUNAI

# SERVICE MANUAL

## 20 Inch Color Television

# TV-2000A MK5



# CONTENTS


1. GENERAL SPECIFICATIONS ..... 1-1
2. PERFORMANCE SPECIFICATIONS ..... 2-1
3. SAFETY PRECAUTIONS ..... 3-1
4. DISASSEMBLY INSTRUCTIONS ..... 4-1
5. ELECTRICAL ADJUSTMENT ..... 5-1
6. BLOCK DIAGRAM ..... 6-1
7. ADJUSTMENT POINTS ..... 7-1
8. TROUBLESHOOTING GUIDES ..... 8-1
9. P.C.BOARD TOP AND BOTTOM VIEWS ..... 9-1
10. WIRING DIAGRAM ..... 10-1
11. SCHEMATIC DIAGRAM ..... 11-1
12. WAVEFORMS ..... 12-1
13. VOLTAGE CHARTS ..... 13-1
14. EXPLODED VIEW ..... 14-1
15. COMPONENT PACKING ..... 15-1
16. MECHANICAL PARTS LIST ..... 16-1
17. ELECTRICAL PARTS LIST ..... 17-1


# 1. GENERAL SPECIFICATIONS

## A) System

| | |
|---|---|
| 1) CRT | :20'(19V), Inline gun, 90°Def.<br>ITC adjusted for Northern Hemisphere magnetic field. |
| 2) Color system | :PAL-B/G, SECAM-B/G,D/K, NTSC 4.43MHz, NTSC3.58MHz<br>(Automatic Switching) |
| 3) Receiving channel<br>— OIRT ch + CCIR ch — | :[VHF low] . . . . . R1-R5ch/E2-E4ch<br>[VHF high] . . . . R6-R12ch/E5-E12ch<br>[UHF] . . . . . .21 ~ 69ch<br>(Can be memory 60 stations) |
| 4) Tuning system | :Voltage synthesizer system |
| 5) Control | |
| * Channel selector | :2-Push switch (up/down) |
| * Sound volume | :2-Push switch (up/down) |
| * Power | :Push switch |
| * Tuning | :2-Push switch (up/down) |
| * Program | :Push switch |
| * Auto memory | :Push switch |
| 6) Connector | |
| * Antenna | :75ohm.....IEC jack |
| * Video in/out | :BNC jack |
| * Audio in/out | :RCA jack |
| * Video/Audio in/out | :Skirt jack (21pin) |



| | |
|---|---|
| 7) Onscreen Display | |
| * Channel | |
| * Volume | |
| * Brightness | |
| * Contrast | |
| * Color | |
| * Clock | |
| * Timer ON/OFF | |
| * Band position | |
| * Sleep timer (10~90 Minute) | |
| * Tuning Indicator | |
| 8) Indicator | |
| * On Timer | :LED (RED) |
| * Stand by | :LED (RED) |
| 9) Degauss | :Automatic Degaussing |
| 10) Speaker | :Oval 2"x3.5" |

## B) IR Remote Control

1) Power
2) Channel 15keys
3) Channel up
4) Channel down
5) Volume up
6) Volume down
7) Mute
8) Sleep
9) Display
10) Channel recall
11) Time select (Clock/Timer On/Off)
12) Picture select (Bright/Cont/Color)
13) Up/Down Control (Picture control/Hour/Minute)
14) Timer set
15)TV/VIDEO

## C) Mechanical

| | |
|---|---|
| 1) Dimension | :(W)480x(D)458x(H)450mm |
| 2) Cabinet | :All plastic cabinet |
| 3) Weight | :19.5kg |
| 4) Packing weight | :21.5kg |

## D) Power supply

| | |
|---|---|
| 1) Rating | :AC 220V/50Hz |
| 2) AC cord | :6 ft PVC cord with IEC type C Plug |

## E) Others

| | |
|---|---|
| 1) Regulations | :IEC-65 passable |

## F) Accessaries

1) Remote control unit
2) 2-AAA batteries for remote control unit
3) Instruction booklet
4) Matching Adaptor
5) VHF Antenna

# 2. PERFORMANCE SPECIFICATIONS

## <Tuner>

*ANT input .....75ohm unbal. IEC connector.
*Reference level .....300mVp-p at Video output.
*Test input signal .....400Hz, 30% modulation.

| | Description | Condition | Unit | Nominal | Limit |
|---|---|---|---|---|---|
| 1. | Peak picture sens. | VHF | dBμV | 20 | 30 |
| | | UHF | dBμV | 30 | 40 |
| 2. | AFT pull in range<br>*Input 80dBμ | | MHz | ±1.0% | ±0.7% |
| 3. | Intermediate freq | Picture | MHz | 38.0 | |
| | | Sound | MHz | 31.5(D/K) | |
| | | | MHz | 32.5(B/G) | |
| 4. | Intercarrier freq. | | MHz | 6.5(D/K) | |
| | | | MHz | 5.5(B/G) | |

## <Deflection>

| | Description | Condition | Unit | Nominal | Limit |
|---|---|---|---|---|---|
| 1. | Deflection freq. | Horizontal (PAL/SECAM) | kHz | 15.625 | |
| | | Horizontal (NTSC) | | 15.75 | |
| | | Vertical (PAL/SECAM) | Hz | 50 | |
| | | Vertical (NTSC) | | 60 | |
| 2. | Linearity | Horizontal | % | | ±15 |
| | | Vertical | % | | ±15 |
| 3. | High voltage | | KV | 25 | |

## <Video & Chroma>

| | Description | Condition | Unit | Nominal | Limit |
|---|---|---|---|---|---|
| 1. | Misconvergence | Center | mm | | 0.4 |
| | | Corner | mm | | 2.0 |
| | | Side | mm | | 1.5 |
| 2. | Over scan | Horizontal | % | 10 | |
| | | Vertical | % | 10 | |
| 3. | Color temperature | | K | 8000K-10MPCD | |
| 4. | Resolution | Horizontal | Line | 300 | |
| | | Vertical | Line | 300 | |
| 5. | Brightness | APL 100% | ft-L | 35 | 25 |

## <Audio>

*All items are measured across 16 ohm resistor at speaker output terminal.

| | Description | Condition | Unit | Nominal | Limit |
|---|---|---|---|---|---|
| 1. | Audio output power | 10%THD | W | 1.2 | 0.8 |
| 2. | Audio distortion | 500mW | % | 2 | 5 |
| 3. | Audio freq. response | -6dB | Hz | | 100-6K |



# 3. SAFETY PRECAUTIONS

1. **Before returning a product to the customer,** always make a safety check of the entire product, including, but not limited to, the following items.

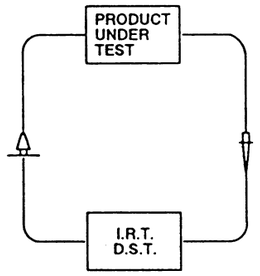
a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing.
(1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience.
(2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this product or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features of fail to perform safety checks may be liable for any resulting damage.**

b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their finger(s) and contact a hazardous voltage. Such opening(s) include, but no limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slot(s), and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

C-1. **Insulation Resistance Check** - With the product AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs tied together and touch the Insulation Resistance Tester(I.R.T.) lead. Other I.R.T. lead contact accessible metal parts (antenna, handle bracket, metal cabinet, screw heads, metallic overlays, control shafts, etc.) If the measured resistance is less than **10.0 megohm,** an abnormality exists that must be corrected before the product is returned to the customer. Repeat this test with the product AC switch in the off. Position, if applicable.

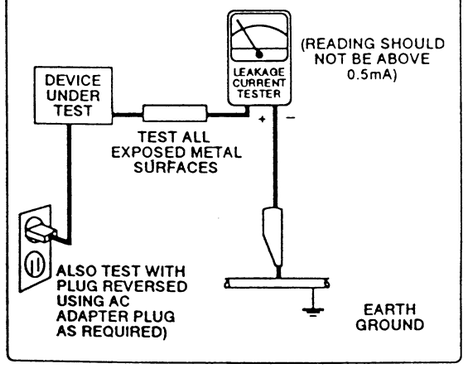
C-2. **Dielectric Strength Test** - With the product AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs tied together and touch the Dielectric Strength tester (D.S.T.) lead. Other D.S.T. lead contact accessible metal parts (antenna, handle bracket, metal cabinet, screw heads, metallic overlays, control shafts, etc.) If the product does not withstand dielectric strength test under condition **AC 3,000V, 1 min., cutoff current max 10 milli-ampere,** an abnormality exists that must be corrected before the product is returned to the customer. Repeat this test with the product AC switch in the off position, if applicable.

Insulation Resistance Check or Dielectric Strength Test




d. **Leakage Current Hot Check** - With the product completely reassembled, plug the AC line cord directly into an AC outlet.(Do not use an isolation transformer during this test.) Use a leakage current tester or an appropriate metering system. With the product AC switch first in the on position and then in the off position, measure from live polarity side to all exposed metal parts of the product (antenna, handle bracket, metal cabinet, screw heads,metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milli-ampere. Reverse the product power cord plug in the outlet and repeat this test.

AC Leakage Test


DEVICE UNDER TEST
LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
TEST ALL EXPOSED METAL SURFACES
ALSO TEST WITH PLUG REVERSED USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

**ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE PRODUCT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSARIES.**

e. **X-Radiation and High Voltage Limits** - Because the picture tube is the primary potential source of X-radiation in solid-state TV receiver, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as specified parts list in this manual.Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold-down".) Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on product labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic.High voltage is maintained within specified limits by close-tolerance safety-related components/adjustments in the high voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning** – Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning** – The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning** – a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.
b. Some TV receiver chassis normally have 85V AC(RS) between chassis and earth ground regardless of the AC plug polarity. These chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.
c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges. b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or trayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.



8. **PRODUCT SAFETY NOTICE** – Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a (⚠) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. Products Safety is under review continuously and new instructions are issued whenever appropriate.

Prior to shipment from the factory, our products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## Precautions during Servicing

1. Parts identified by the ⚠ symbol are critical for safety.
   Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
   Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulators for transistors.
5. When replacing AC primary side components (transformers, power cords. etc.), wrap ends of wires securely about the terminals before soldering.
6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. When a power cord has been replaced, check that 10 – 15 kg of force in any direction will not loosen it.
9. Also check areas surrounding repaired locations.
10. Use care that foreign objects (screws, solder droplets. etc.) do not remain inside the set.
11. Crimp type wire connector
    When replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, in order to prevent shock hazards, perform carefully and precisely the following steps.
    Replacement procedure
    1) Remove the old connector by cutting the wires at a point close to the connector.
       Important: Do not re-use a connector (discard it).
    2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
    3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
    4) Use the crimping tool to crimp the metal sleeve at the center position.
       Be sure to crimp fully to the complete closure of the tool.
12. When connecting or disconnecting the VCR connectors; First, disconnection the AC plug from AC supply socket.

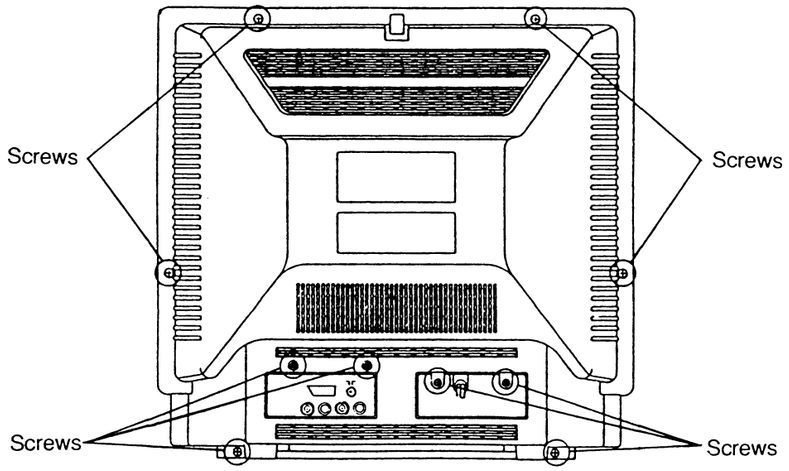
## Safety Check after Servicing

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, video and audio output terminals, etc.).
2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio output terminals, etc.).
3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance.
4. **Leakage current test**
   Confirm specified or lower leakage ccurrent between power cord plug prongs (earth ground) and externally exposed parts (RF terminal, video and audio input and output terminals, etc.).

# 4. DISASSEMBLY INSTRUCTIONS

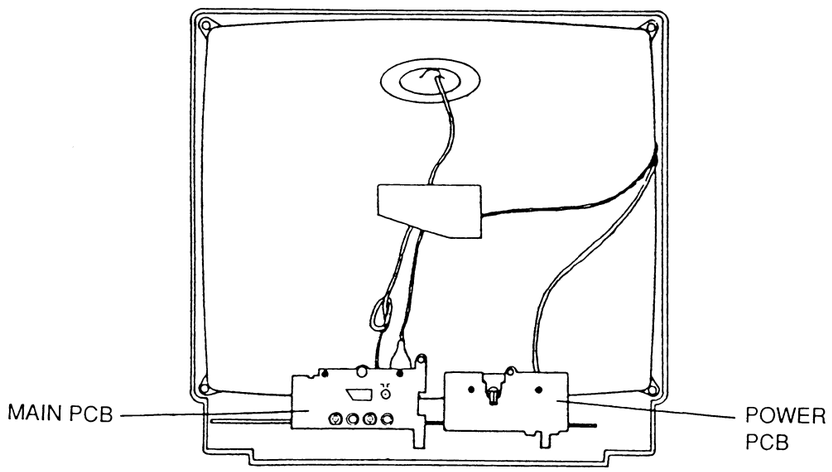
## 1. REAR CABINET REMOVAL

1-1. Disconnect the AC power cord.
1-2. Remove 10 screws from the rear cabinet.
1-3. To re-install, reverse the above procedure.



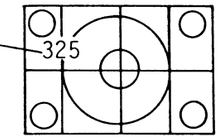
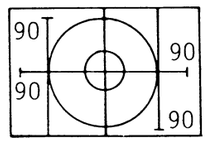
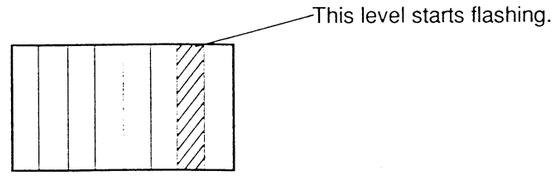

## 2. MAIN PCB/POWER PCB ASS'Y REMOVAL

2-1. Unplug the AC power cord, remove the rear cabinet.
2-2. Disconnect all connectors from MAIN PCB to POWER PCB.
2-3. Pull the MAIN PCB and POWER PCB to back-ward.
2-4. To re-install, reverse the above procedure.

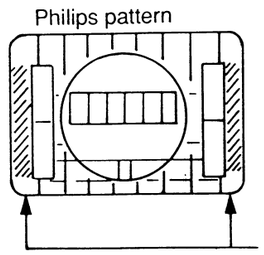
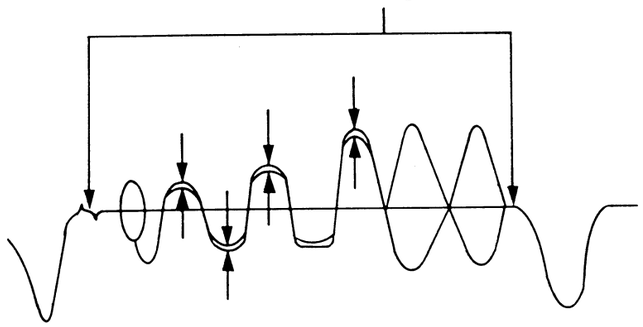




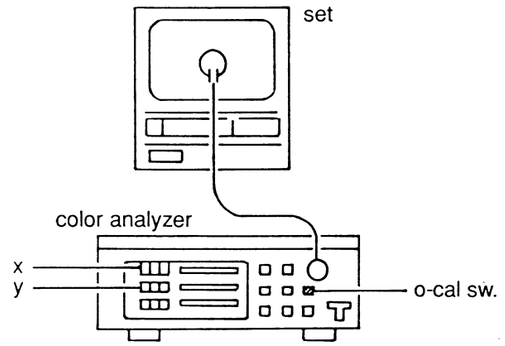

# 5. ELECTRICAL ADJUSTMENT

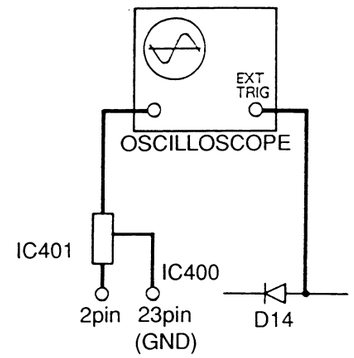
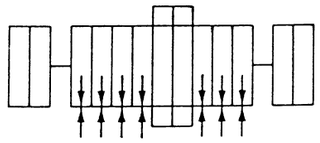
| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 1. Focus | FOCUS VR. | 1. Input monoscope-pattern.<br>2. Align the focus while using the figure 325 (indicating number of the resolution) at the upper left of the monoscope pattern as reference, and check to ensure that no fading is detected in the center and all four corners.<br>(Set the CONTRAST/BRIGHT control to center.)<br><br>Align the focus with this figure serving as a standard.   |
| 2. Cut Off | VR1, VR2, VR3, VR4, VR5 SCREEN VR. | 1. Input Black signal.<br>2. Set the SCREEN (counter-clockwise), VR1, and VR4 (counter-clockwise) to min.<br>3. Turn the Service switch ON.<br>4. Adjust the SCREEN to a point where the horizontal GREEN line starts flashing.<br>5. Adjust VR1(blue) and VR4(red) till the horizontal line turn white.<br>6. Turn the service switch OFF.<br><br>**Note:** At this time, each VOL. of R.Drive(VR2) and B.Drive(VR5) should be in center. |
| 3. V.size | VR403 | 1. Input monoscope pattern.<br>2. Adjust VR403 so that the monoscope V.SIZE display becomes 90%. Align horizontal/vertical balance, and then adjust so that the circle in the monoscope pattern center becomes truly round.<br><br>   |
| 4. Sub Bright | VR400 | 1. Input the gray scale. (8 STEP)<br>2. Set CONT.BRIGHT to center.<br>3. Adjust VR400 to point where the level one step higher than the black level starts flashing.<br><br>   |

**Note:** The COLOR/CONTRAST/BRIGHT CONTROL, unless otherwise specified, should all be set to center.

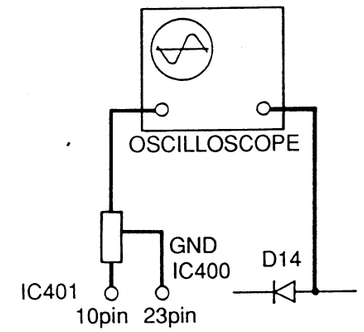
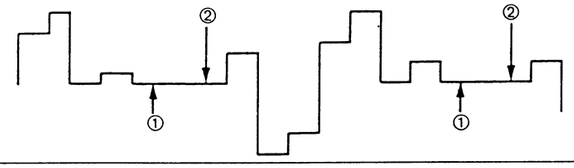
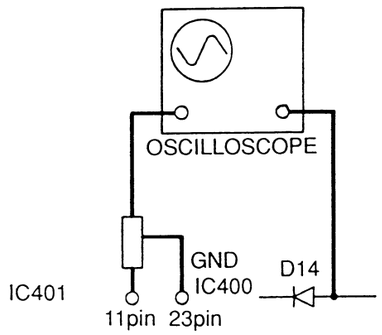
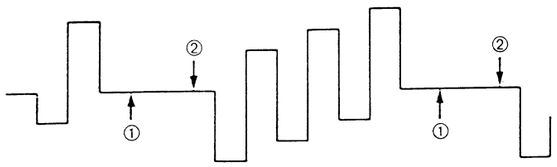
| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 5. 1H delay line | VR402, VR401, L402 | 1. Input the Philips pattern.<br><br>2. Connect the oscilloscope to IC400 pin 37. (Synchronize the oscilloscope externally through the D14 anode.)<br><br>3. Adjust VR402, VR401, L402 so that the amplitude at Anti-PAL signal part becomes minimal (no color) and the waveform at the color bar part is not seen in double ("Venetian Blind" does not appear at the color bar signal part).<br><br>Philips pattern<br>  <br>Anti-PAL signal<br>  |

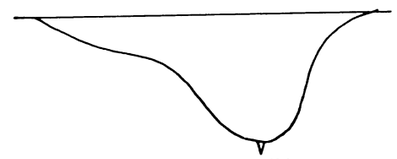
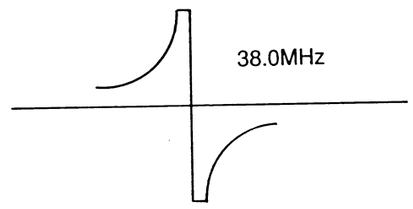


| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 6. White Balance | VR5, VR2, VR1, VR4 | 1. Input APL 100% white.<br>2. After aging for 20-30 minutes, demagnetize the tube (CRT) surface with a demagnetizer.<br>3. Set the color analyzer to the CHROMA mode, and after zero point calibration, bring the optical receptor into close contact with the center on the tube surface (CRT), and adjust R.DRIVE (VR5) and B.DRIVE (VR2) so that the respective chroma temperatures become 8000K-10MPCD (X:0.300/Y:0.290).<br>4. Turn the service switch ON.<br>5. At this time, check that the horizontal line is white. If the horizontal line is not white, adjust the CUT-OFF VR, VR1 (blue), VR4 (red) until proper alignment is reached.<br>6. Turn the service switch OFF, and using the color analyzer, check that the chroma temperatures read the preset values.<br>7. Repeat steps 3, 4, 5, 6 above, and adjust so that the setting of chroma temperature and horizontal line are at their best.<br><br>  <br><br><br>**Note 1:** Be sure the tube surface faces east.<br>**Note 2:** Make this adjustment under European magnetic field. (Vertical: 0.4G/Horizontal: 0.2G)<br>**Note 3:** Always adjust SUB-BRIGHT, V-SIZE, OUT-OFF, and PAL.<br>**Note 4:** The allowable range during chroma temperature adjustment should be ±5% Max.<br>x:0.285 to 0.315<br>y:0.275 to 0.305 |

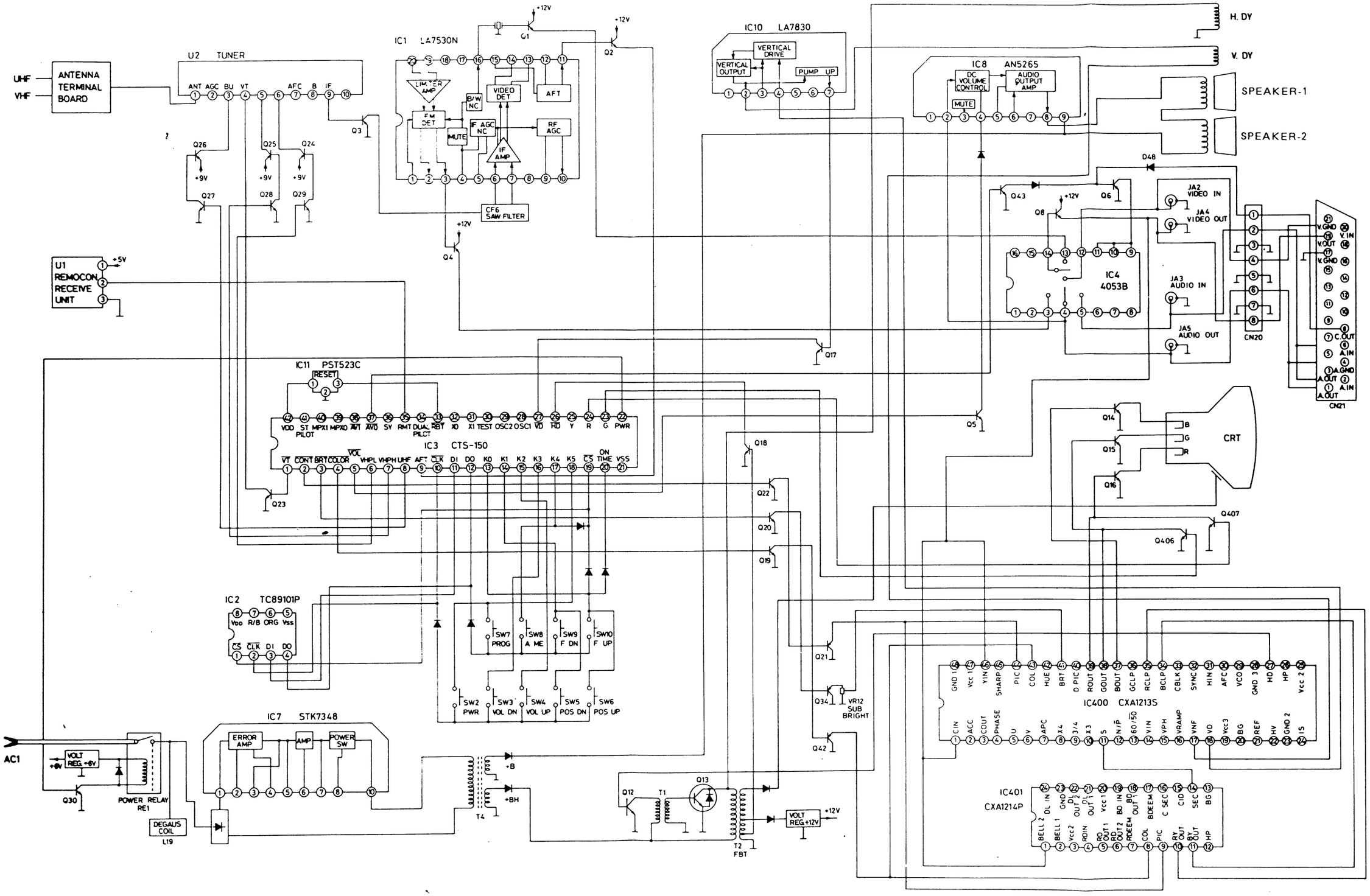
| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 7. Adjusting the Frequency to 4.43MHz and 3.58MHz. | C444, C445 | 1. Using the same adjusting manner as in the CLOCK adjustment, adjust C444 to 4.433619 ±10Hz.<br>2. Using the same adjusting manner as in 4.43MHz adjustment, adjust C445 to 3.579545 ±10Hz. |
| 8. SECAM Chroma Bell Filter | L405 | 1. Input the SECAM color bar signal.<br>2. Turn the CONTRAST, BRIGHT, COLOR control to max.<br>3. Connect the oscilloscope as following drawing.<br>  <br>4. Adjust L405 with core driver to flat wave from at arrow marked on following drawing.<br>  |



| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 9. R-Y Demodulate Coil | L407 | 1. Input the SECAM color bar signal.<br>2. Turn the CONTRAST, BRIGHT, COLOR control to max.<br>3. Connect the oscilloscope as following drawing.<br>  <br>4. Adjust L407 with core driver to meet same level with a(blank-ing) and i (white) as following drawing.<br>  |
| 10. B-Y Demodulate Coil | L404 | 1. Input the SECAM color bar signal.<br>2. Turn the CONTRAST, BRIGHT, COLOR control to max.<br>3. Connect the oscilloscope as following drawing.<br>  <br>4. Adjust L404 with core driver to meet same level with a(blank-ing) and i (white) as following drawing.<br>  |

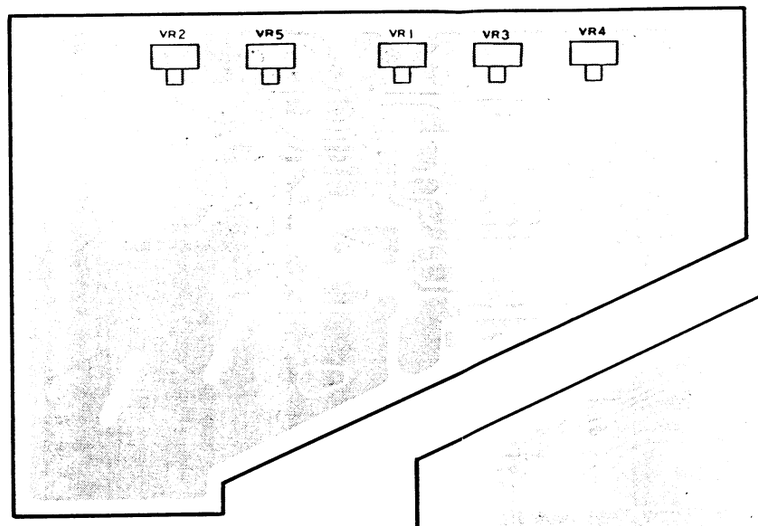
| Alignment Item | Alignment Points | Alignment Method |
|---|---|---|
| 11. 38.0MHz Peak Adjustment | L2 | 1. Connect "OUTPUT" of sweeper to "the 6th pin" of "IC1".<br>Frequency set of sweeper are below;<br>(1)31.5MHz (2)32.5MHz (3)33.57MHz (4)35.8MHz<br>(5)38.0MHz (6)39.5MHz<br>2. Connect the oscilloscope to "the 10th pin" of "IC1".<br>3. Load DC voltage to "the 4th pin" of "IC1", as the wave of oscilloscope not to clip.<br>4. Adjust "L2", as the marker for 38.0MHz to be peak.<br>  <br>38.0MHz |
| 12. AFT Curve Adjustment | L3 | 1. Connect the sweeper to "TEST POINT" of inside of "TUNER". Frequency set is same in case of adjustment for peak.<br>2. Connect oscilloscope to "the 11th pin" of "IC1".<br>3. Adjust "L3", as the marker for 38.0MHz to the center of "AFT" curve.<br>  <br>38.0MHz |
| 13. RF AGC Adjustment | VR13 | 1. Receive the signal for 2ch (48.25MHz)<br>2. Set "the level of input" of "RF" to 80dBμwith color-bar.<br>3. Connect the digital voltmeter to the AGC terminal of "TUNER".<br>4. Adjust "VR13", as indication of the digital voltmeter to be 4.0V. |
| 14. ON SCREEN Point Adjustment | L22 | 1. Input color-bar.<br>2. Indicate "ON SCREEN" as to be a bar white, "PICTURE SELECT KEY".<br>3. Adjust "L22" as the distance between both the ends of "ON". |
| 15. Clock Adjustment | C143 | 1. Short between "the 17th pin and the 20th pin of IC3" with diode.<br>(17) —▷— (20) *Connect AC-cord and remove diode off.<br>2. Connect F-counter to from 17th pin to the 20th pin.<br>3. Adjust "C143" as the frequency to be 87381.3334±0.5MHz. |

# 6. BLOCK DIAGRAM

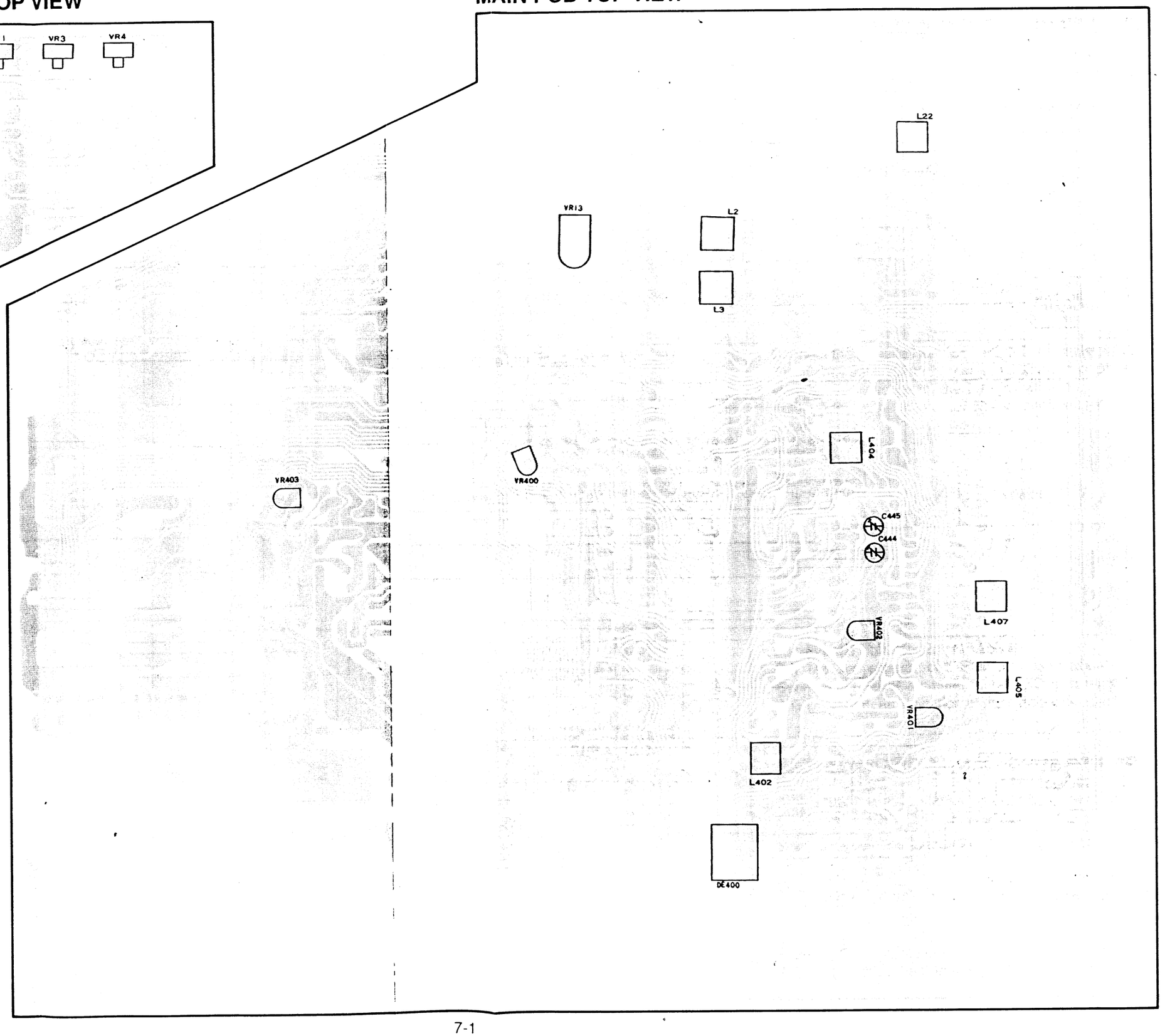


# 7. ADJUSTMENT POINTS

## CRT PCB TOP VIEW

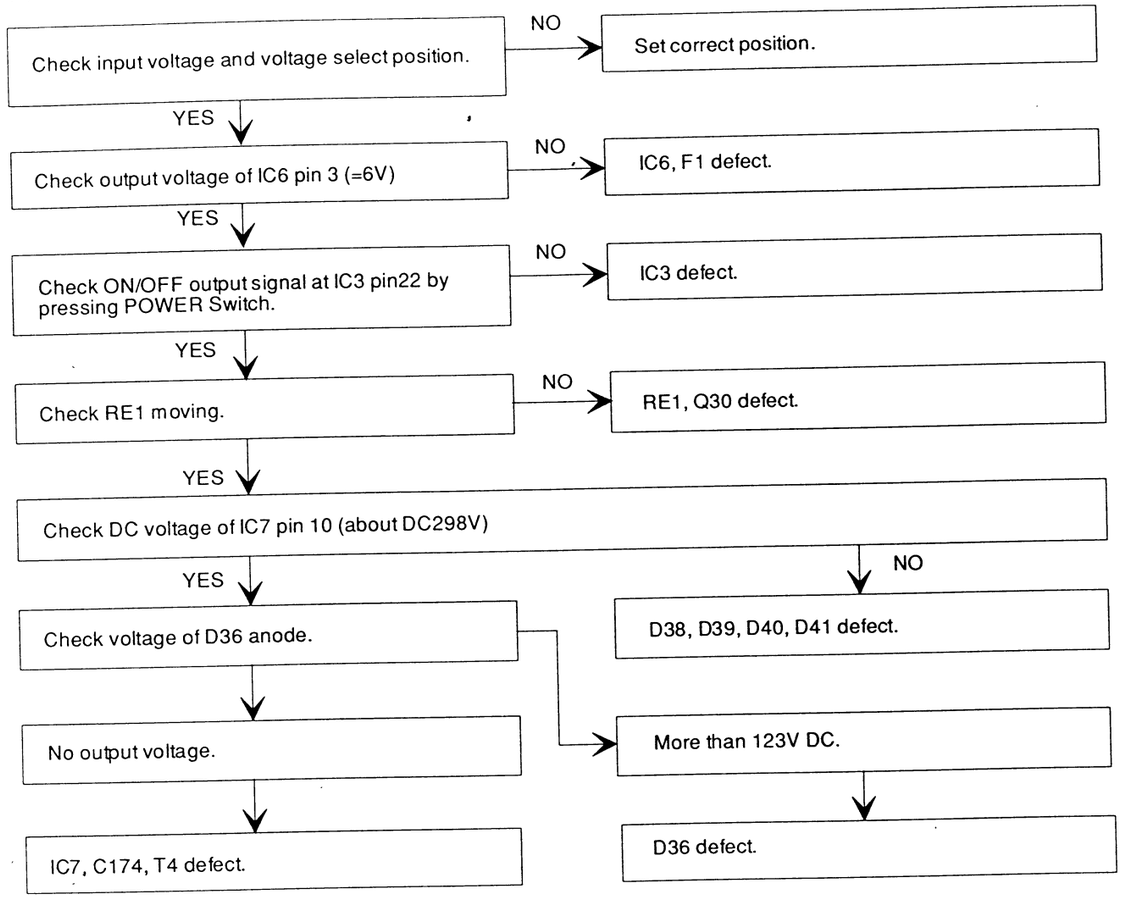



## MAIN PCB TOP VIEW

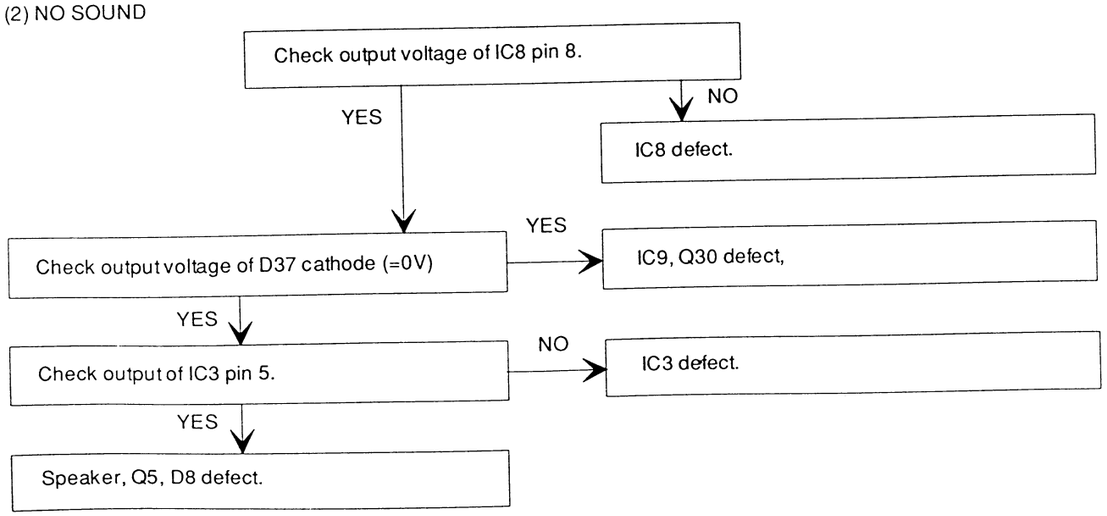


# 8. TROUBLESHOOTING GUIDES

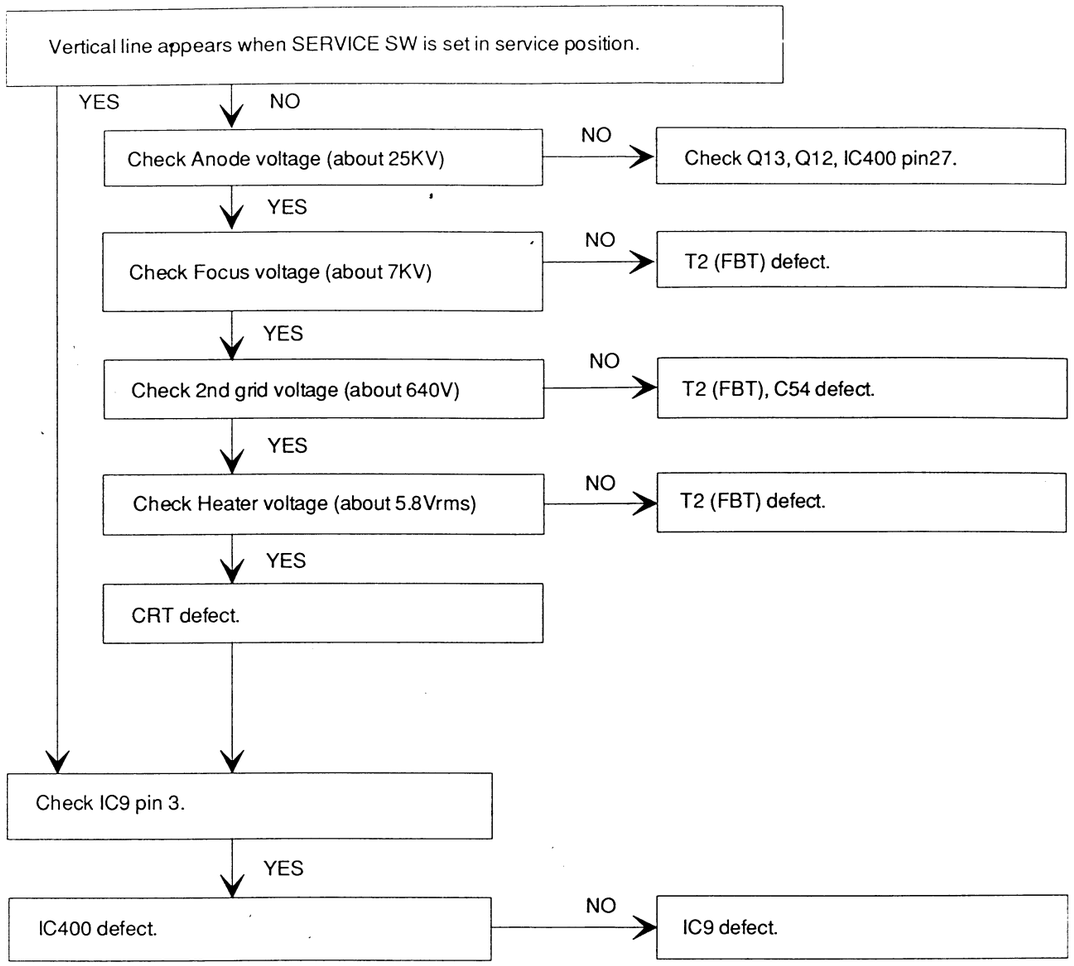
(1) NO POWER OUTPUT




(2) NO SOUND

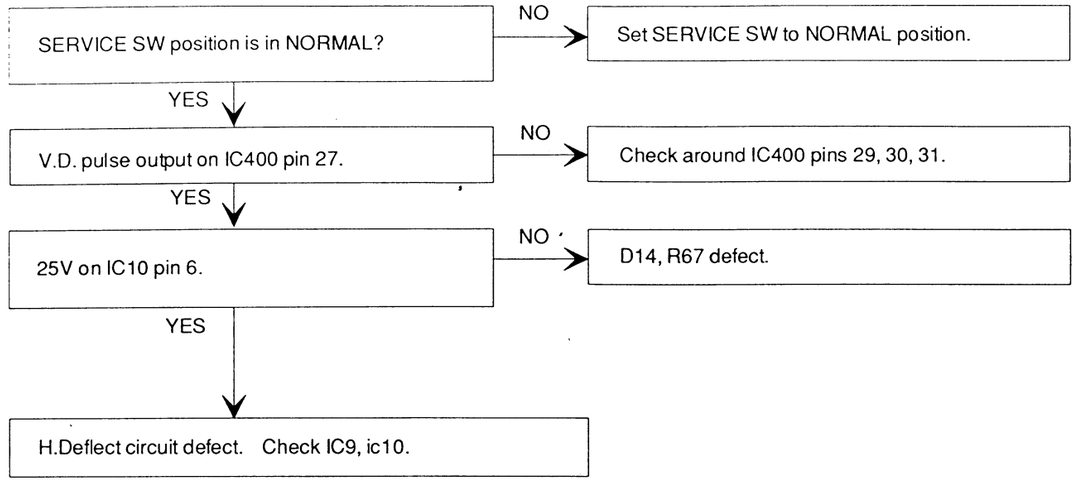


(3) NO RASTER WITH SOUND

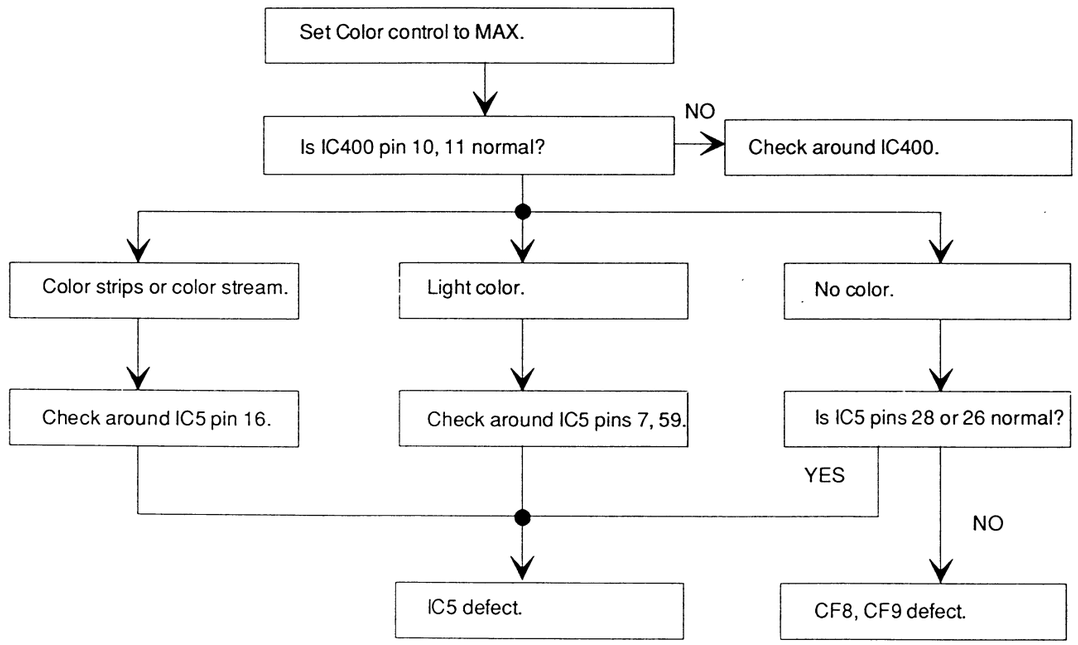




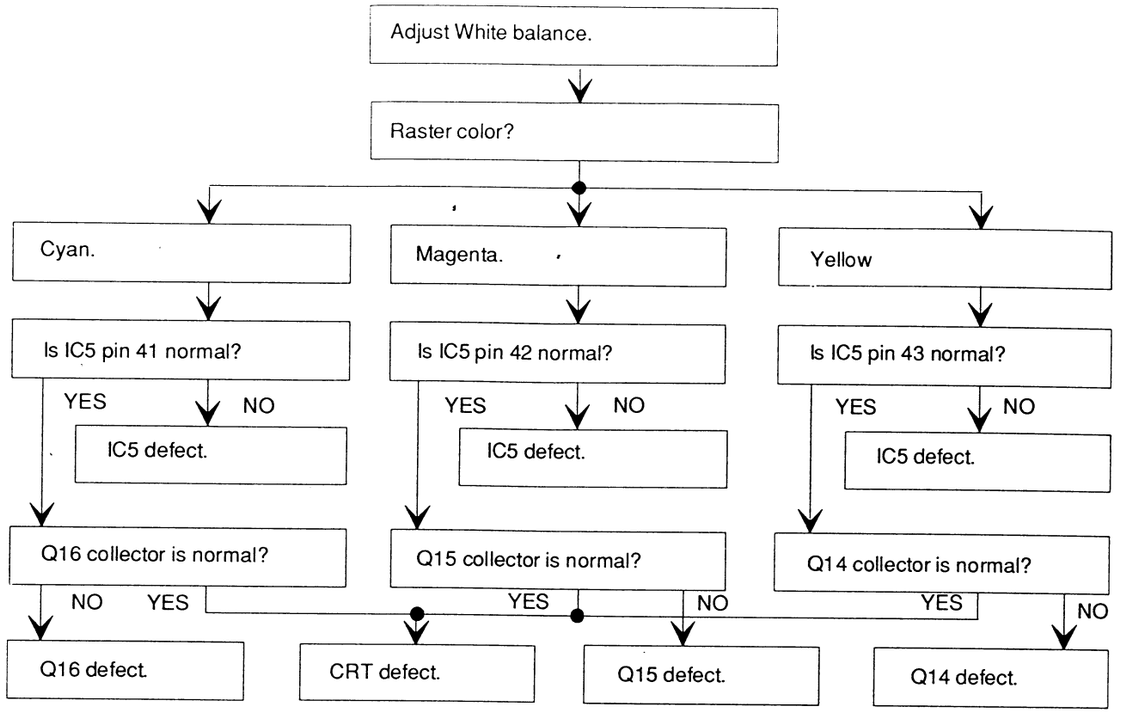

(4) NO HORIZ DEFLECT (ONLY V. LINE)



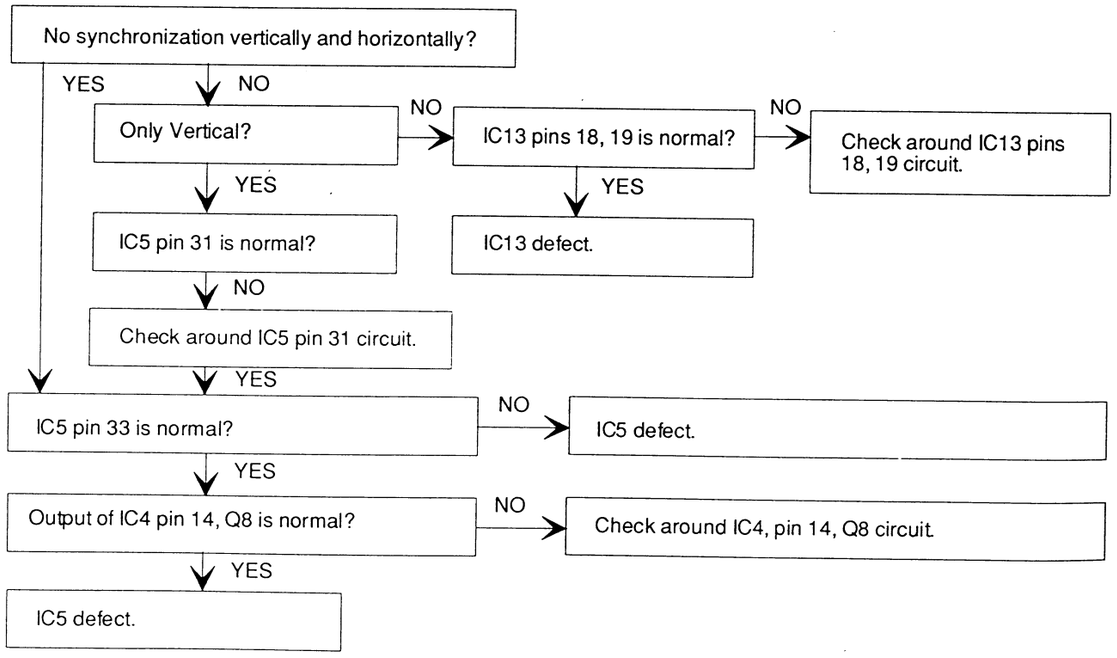

(5) NO COLOR



(6) DEFECTIVE COLOR

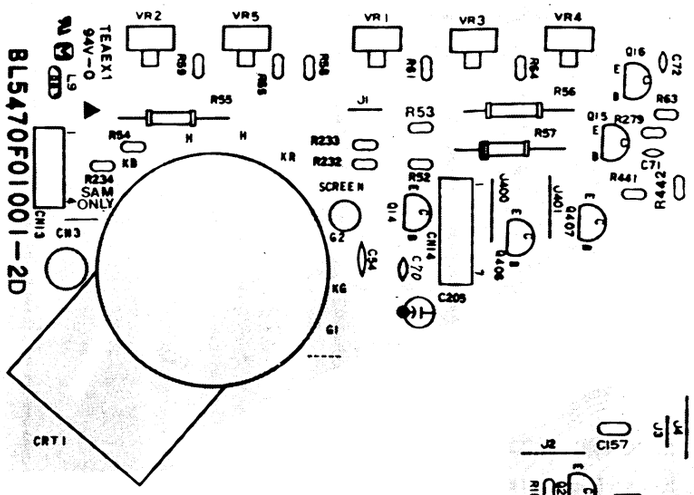



(7) NO SYNCHRONIZATION

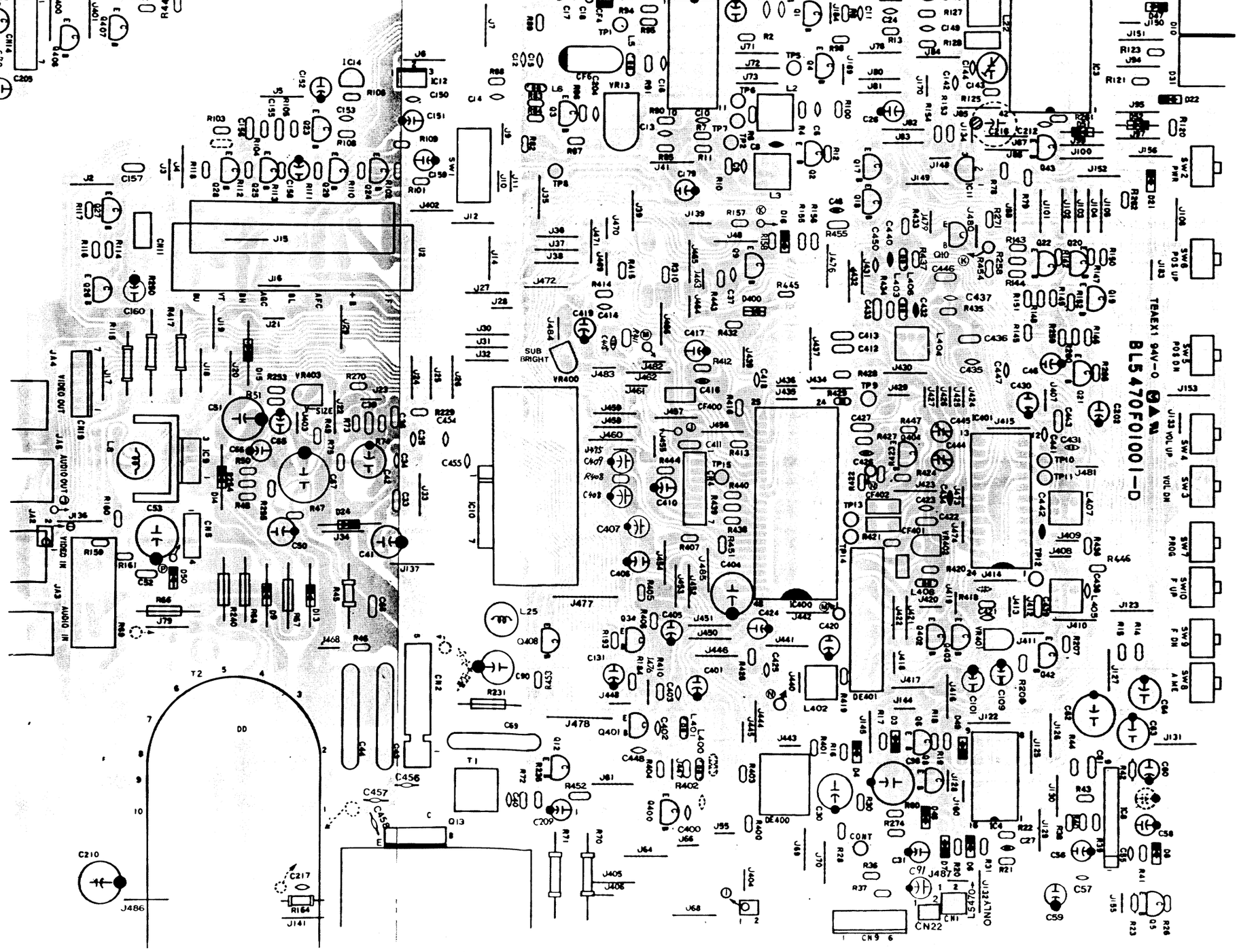

No synchronization vertically and horizontally?
YES
NO
Only Vertical?
IC13 pins 18, 19 is normal?
Check around IC13 pins 18, 19 circuit.
IC13 defect.
IC5 pin 31 is normal?
Check around IC5 pin 31 circuit.
IC5 pin 33 is normal?
IC5 defect.
Output of IC4 pin 14, Q8 is normal?
Check around IC4, pin 14, Q8 circuit.
IC5 defect.

# 9. P.C.BOARD TOP AND BOTTOM VIEWS

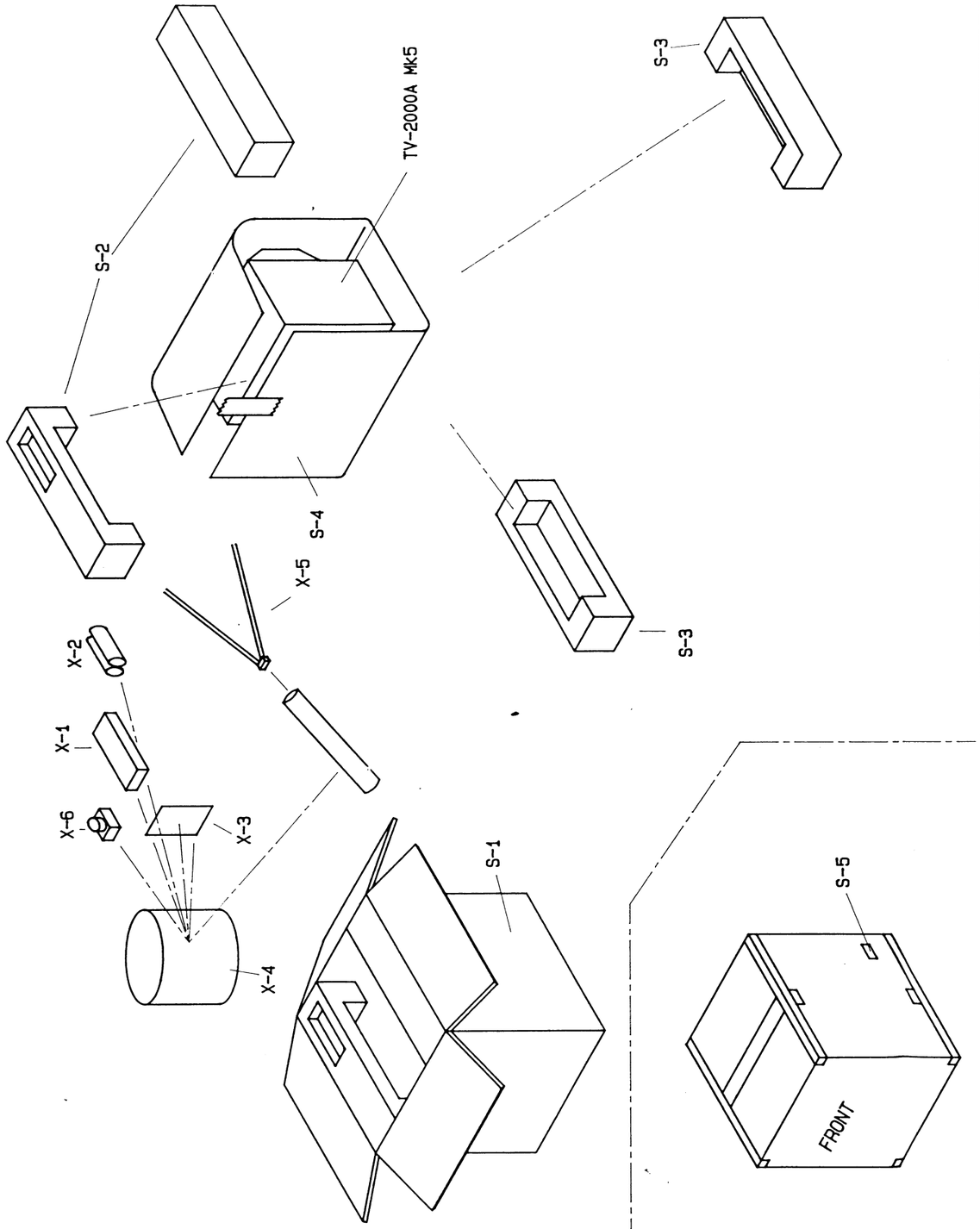
## CRT PCB TOP VIEW




## MAIN PCB TOP VIEW



# 15. COMPONENT PACKING






# 16. MECHANICAL APSRT LIST

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| A-1 | FRONT CABINET ASS'Y | 0EMN00474 |
| A-1-1 | FRONT CABINET | 0EM100242 |
| A-1-2 | REAR CABINET MOUNTING BOSS | 21WH071 |
| A-2 | CONTROL KNOB | 0EM300327 |
| A-3 | INDICATOR WINDOW | 0EM400801 |
| A-4 | SENSOR WINDOW | 0EM400840 |
| A-5 | REAR CABINET | 21CH200 |
| A-6 | RATING LABEL | 0EM401055 |
| A-7 | BRAND BADGE | 21WH080 |
| A-8 | ANT. JACK HOLDER | 0EM300220 |
| A-9 | AC CORD HOLDER | 21WH085 |
| A-10 | COVER PLATE | 0EM400479 |
| A-11 | DECORATION TAPE | 0EM400896 |
| B-1 | STOPPER HOLDER | 23WH089 |
| B-2 | CRT MOUNTING BOSS LU,RD ASS'Y | 21WH067X |
| B-3 | CRT MOUNTING BOSS LD,RU ASS'Y | 21WH068X |
| B-5 | M6 NUT | 27WH001 |
| B-6 | TENTION SPRING | 26WH006 |
| B-7 | LED HOLDER | 21WH065 |
| B-9 | SPACER | 0EM400717 |
| L-1 | TAP TIGHT SCREW 3X8 | GFMB3080 |
| L-2 | TAP TIGHT SCREW 3X10 | GBMB3100 |
| L-3 | TAP TIGHT SCREW 3X16 | GBMB3160 |
| L-4 | TAP TIGHT SCREW 3X10 | GBMP3100 |
| L-5 | TAP TIGHT SCREW 3X12 | GBKP3120 |
| L-6 | TAP TIGHT SCREW 4X20 | GBMP4200 |
| L-7 | TAP TIGHT SCREW 4X16 | GBMP4160 |
| L-8 | TAP TIGHT SCREW 4X18 | GBKP4180 |
| Z-5 | SCOTCH TAPE #880 (for D. COIL) | 0EZZ00026 |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| | **ACCESSORIES** | |
| X-1 | REMOCON UNIT | UREMT30MS002 |
| X-2 | BATTERY | 1813020 or 1790849 or 579W100 |
| X-3 | OWNER'S MANUAL | 0EMN00473 |
| X-4 | POLYETHYLENE BAG | Z221350 |
| X-5 | VHF ANTENNA | 27AH011 or 27AH012 |
| X-6 | MATCHING ADAPTOR | 1813642 or 1780283 |
| | **PACKAGE** | |
| S-1 | CARTON | 0EM401091 |
| S-2 | SET PAD (TOP) | 0EM200152 |
| S-3 | SET PAD (BOTTOM) | 0EM200153 |
| S-4 | SET SHEET | 32EH014 |
| S-5 | SERIAL NO. LABEL | TS7619 |

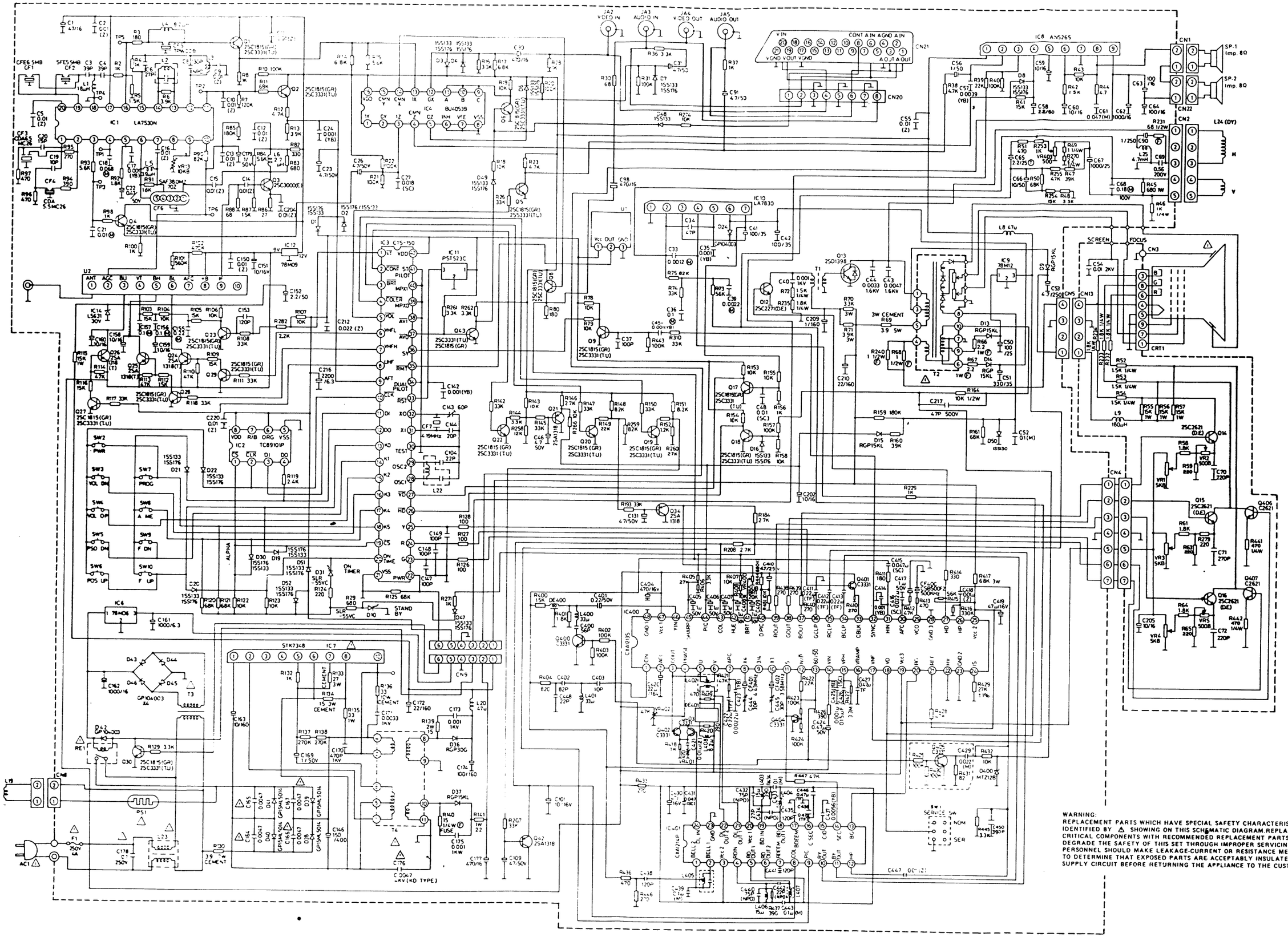
# 17. ELECTRICAL PARTS LIST

**PRODUCT SAFETY NOTE:** Products marked with a ⚠ have special charactoeristics important to safety. Before replacing any of these compornents, read carefully the products safety notice of this service manual. Don't degrade the safety of the product through improper servicing.

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| | ASS'Y, PCB, MAIN<br>CONSISTS OF THE FOLLOWING: | BL5470F01001-D |
| | CAPACITORS | |
| C 1 | Electrolytic 47uF/16V ±20% | 126C476S |
| C 2 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 3 | Ceramic ±5% 39pF/50V | 3270390S or |
| | Ceramic ±5% 39pF/50V | 3S41390S |
| C 4 | Ceramic ±5% 39pF/50V | 3270390S or |
| | Ceramic ±5% 39pF/50V | 3S41390S |
| C 5 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 6 | Ceramic ±5% 27pF/50V | 3270270S or |
| | Ceramic ±5% 27pF/50V | 3S41270S |
| C 8 | Ceramic NPO 130pF | 12CH131S |
| C 9 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 10 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 11 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 12 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 13 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 14 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 15 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 16 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 17 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |
| C 18 | Mylar 0.068uF/50V ±10% | 2250683S or |
| | Mylar 0.068uF/50V ±10% | 1250683S |
| C 19 | Ceramic ±0.5% 10pF/50V | 3270100S or |
| | Ceramic ±5% 10pF/50V | 3S41100S |
| C 20 | Ceramic ±5% 15pF/50V | 3270150S or |
| | Ceramic ±5% 15pF/50V | 3S41150S |
| C 21 | Mylar 0.01uF/50V K | 2250103S or |
| | Mylar 0.01uF/50V ±10% | 1250103S |
| C 22 | Electrolytic 0.47uF/50V ±20% | 126F474S |
| C 23 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 24 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |
| C 26 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 27 | Semiconductive ±10% 0.018uF/25V | 12Y2183S |
| C 30 | Electrolytic 470uF/16V ±20% | 626C477 |
| C 31 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 33 | Mylar 0.0012uF/50V ±10% | 2250122S or |
| | Mylar 0.0012uF/50V ±10% | 1250122S |
| C 34 | Ceramic ±5% 47pF/50V | 3270470S or |
| | Ceramic ±5% 47pF/50V | 3S41470S |
| C 35 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |

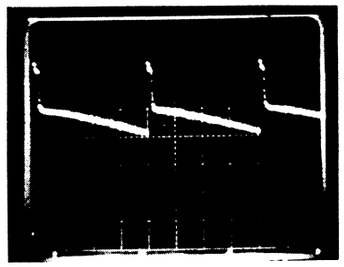
| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| C 36 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 37 | Ceramic ±10% 100pF/50V | 32B3101S or |
| | Ceramic ±10% 100pF/50V | 3B42101S |
| C 39 | Mylar 0.0022uF/50V ±10% | 2250222S or |
| | Mylar 0.0022uF/50V ±10% | 1250222S |
| C 40 | Ceramic 0.001uF/1KV | 6220574 |
| C 41 | Electrolytic 100uF/35V ±20% | 6.3E+109 |
| C 42 | Electrolytic 100uF/35V ±20% | 6.3E+109 |
| C 43 | P.P. 0.0047uF 1.6KV | 122Z183 or |
| | P.P. 0.0047uF 1.6KV | 1220496 |
| C 44 | P.P. 0.0039/1.6KV | 1220495 or |
| | P.P. 0.0039/1.6KV | 122Z281 |
| C 46 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 48 | Semiconductive ±10% 0.01uF/25V | 12Y2103S |
| C 50 | Electrolytic 100uF/25V ±20% | 626D107 |
| C 51 | Electrolytic 330uF/35V ±20% | 626E337 |
| C 52 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 53 | Electrolytic 4.7uF/250V ±20% | 6220691 or |
| | Electrolytic 4.7uF/250V ±20% | 122Z343 |
| C 55 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 56 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 57 | Ceramic ±10% 0.0039uF/50V | 32B3392S or |
| | Ceramic ±10% 0.0039uF/16V | 3X4D392S |
| C 58 | Electrolytic 2.2uF/50V ±20% | 126F225S |
| C 59 | Electrolytic 10uF/16V ±20% | 626C106 |
| C 60 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 61 | Mylar 0.047uF/50V ±10% | 2250473S or |
| | Mylar 0.047uF/50V ±10% | 1250473S |
| C 62 | Electrolytic 1000uF/16V ±20% | 626C108 |
| C 63 | Electrolytic 100uF/16V ±20% | 126C107S |
| C 64 | Electrolytic 100uF/16V ±20% | 126C107S |
| C 65 | Tantal Electrolytic 2.2uF/25V | 122F259 or |
| | Tantal Electrolytic 2.2uF/25V ±10% | 122F225 |
| C 66 | Electrolytic 10uF/50V ±20% | 126F106S |
| C 67 | Electrolytic 1000uF/25V ±20% | 626D108 |
| C 68 | Mylar 0.18uF/100V ±10% | 2251184 or |
| | Mylar 0.18uF/100V ±10% | 1251184 |
| C 69 | P.P. 0.47uF/200V | 122Z256 or |
| | P.P. 0.47uF/200V | 1220511 |
| C 90 | Electrolytic 1uF/250V | 6220690 or |
| | Electrolytic 1uF/250V ±20% | 122Z340 |
| C 91 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 98 | Electrolytic 470uF/16V ±20% | 626C477 |
| C 101 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 104 | Ceramic ±5% 22pF/50V | 3270220S or |
| | Ceramic ±5% 22pF/50V | 3S41220S |
| C 109 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 131 | Electrolytic 4.7uF/50V ±20% | 126F475S |
| C 142 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |
| C 143 | Torimar 60pF | 1280137 |
| C 144 | Ceramic ±5% 20pF/50V | 3270200S or |
| | Ceramic ±5% 20pF/50V | 3S41200S |

# 11. SCHEMATIC DIAGRAM

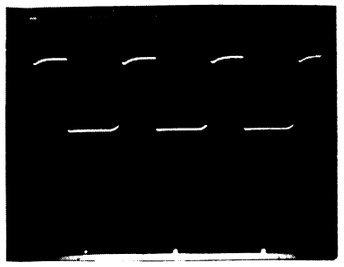


WARNING:
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY △ SHOWING ON THIS SCHEMATIC DIAGRAM.REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING. SERVICE PERSONNEL SHOULD MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

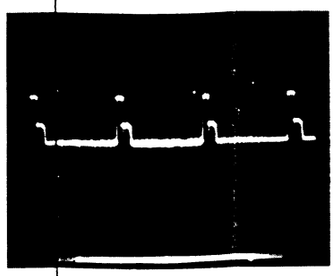
# 12. WAVEFORMS



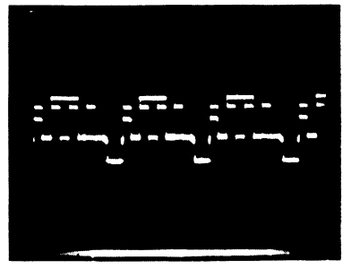
Point : A
1Div = 5ms
1Div = 20V



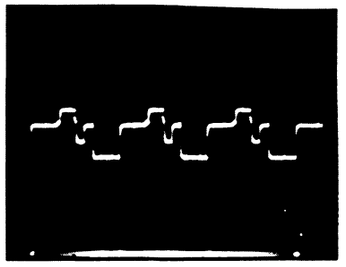
Point : E
1Div = 20us
1Div = 50V



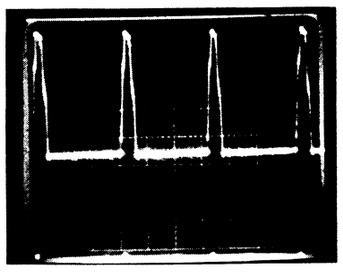
Point : I
1Div = 20us
1Div = 2V



Point : M
1Div = 20us
1Div = 2V

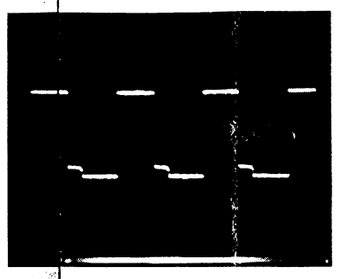


Point : Q
1Div = 20us
1Div = 50V

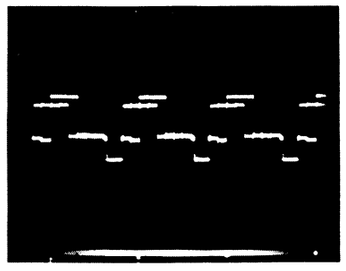


Point : B
1Div = 20us
1Div = 5V

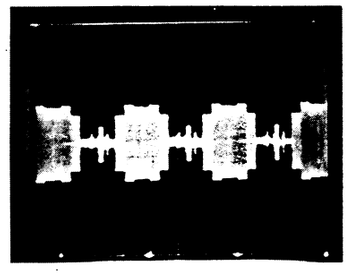
Point : F
1Div = 10us
1Div = 100V



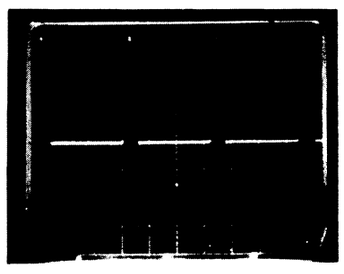
Point : J
1Div = 20us
1Div = 2V



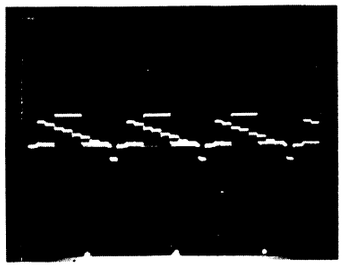
Point : N
1Div = 20us
1Div = 2V



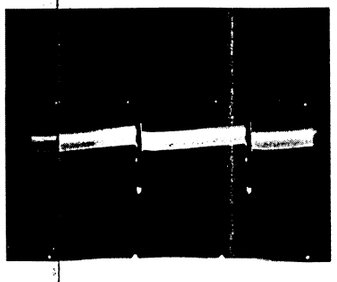
Point : R
1Div = 20us
1Div = 0.1V



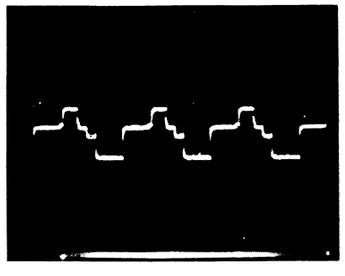
Point : C
1Div = 20us
1Div = 250V



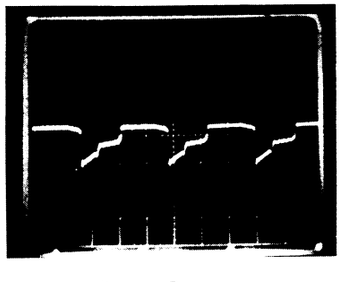
Point : G
1Div = 20us
1Div = 0.5V



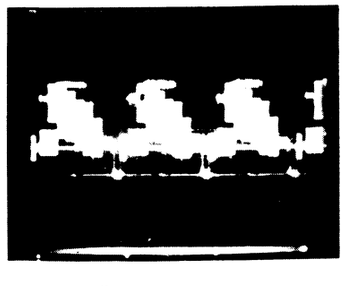
Point : K
1Div = 5ms
1Div = 0.5V



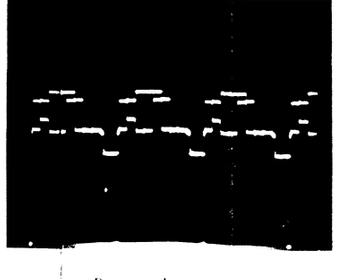
Point : O
1Div = 20us
1Div = 50V



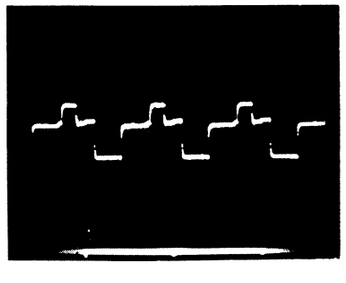
Point : D
1Div = 20us
1Div = 2V



Point : H
1Div = 20us
1Div = 0.5V

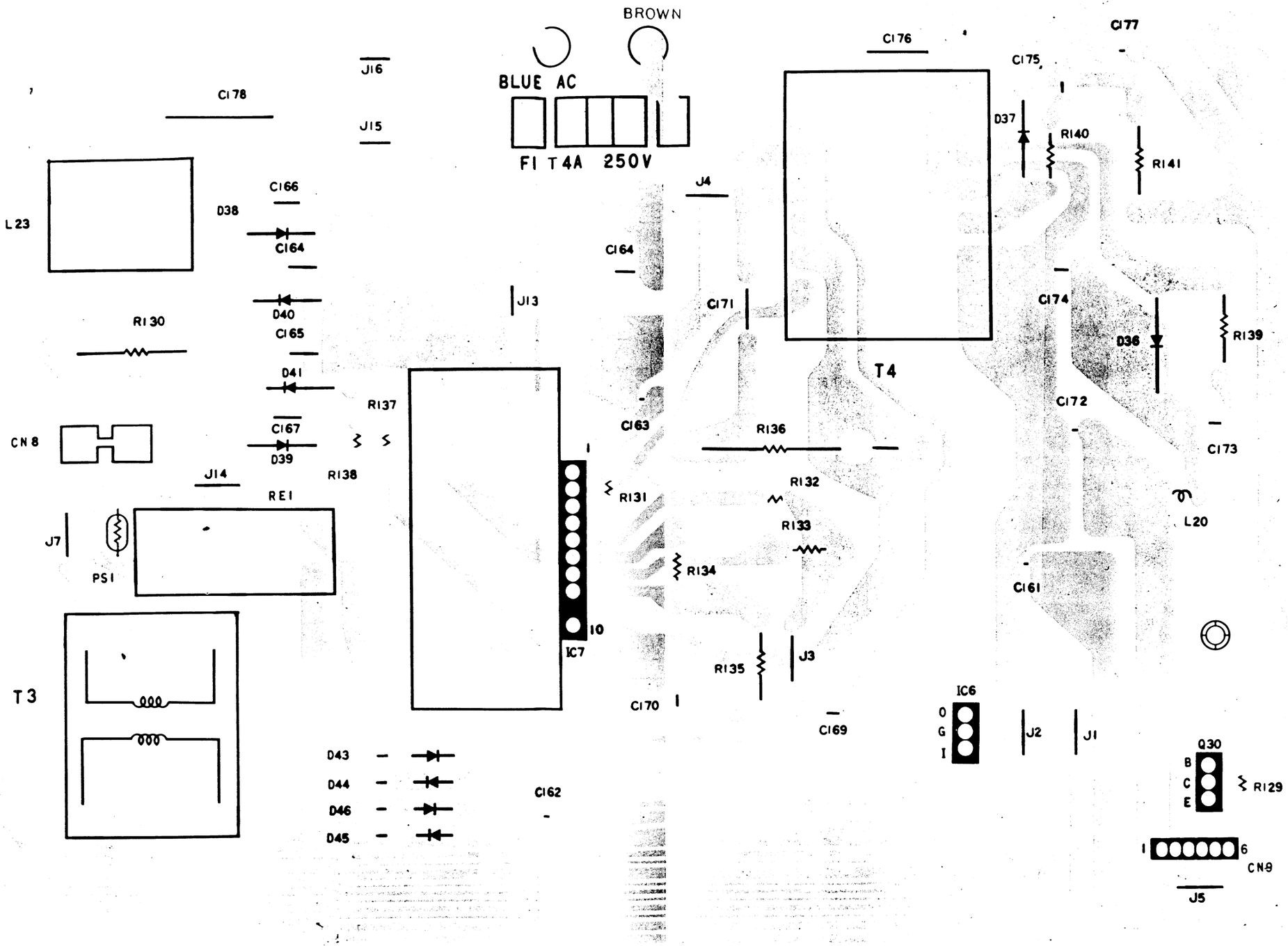


Point : L
1Div = 20us
1Div = 2V

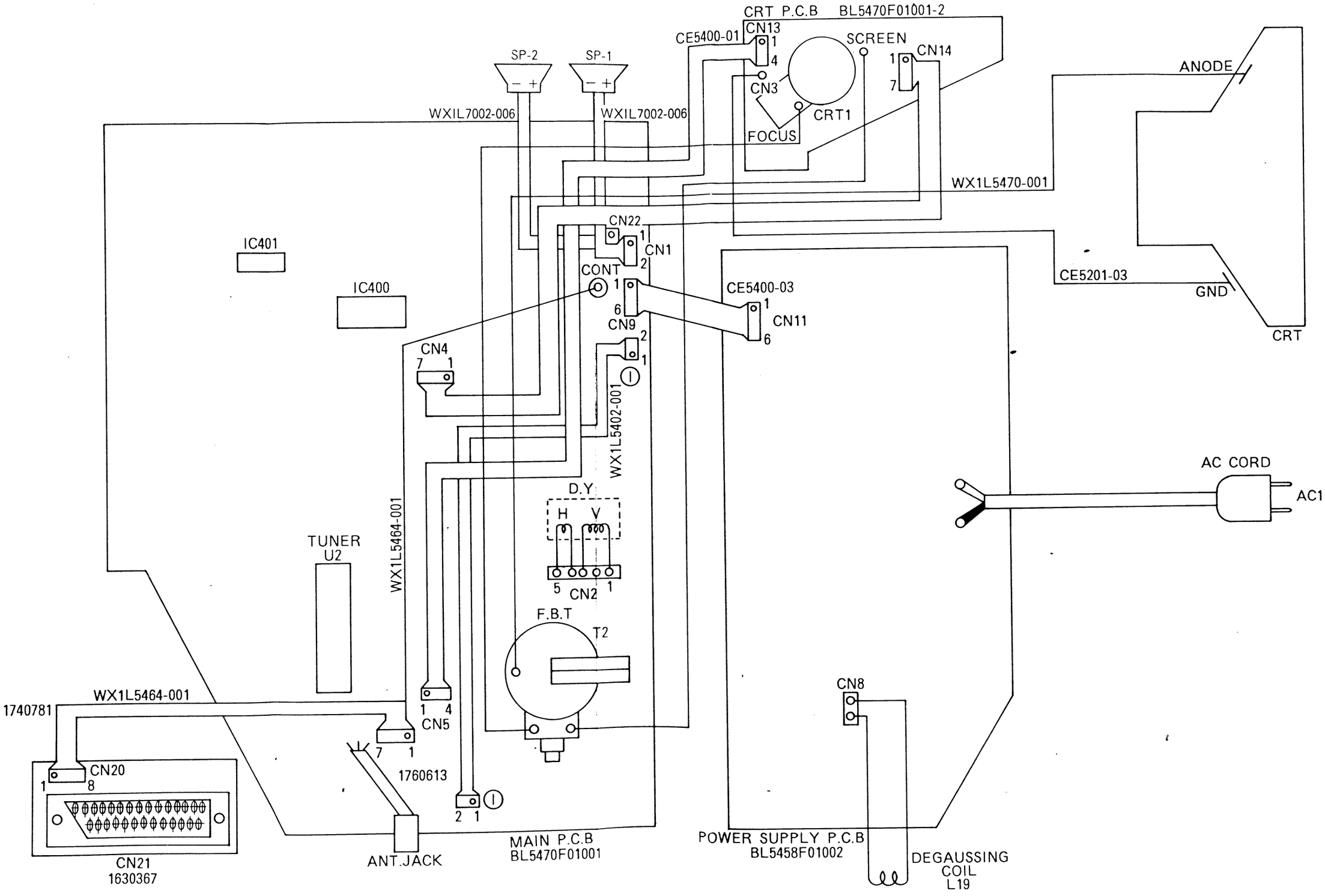


Point : P
1Div = 20us
1Div = 50V

# POWER SUPPLY PCB BOTTOM VIEW

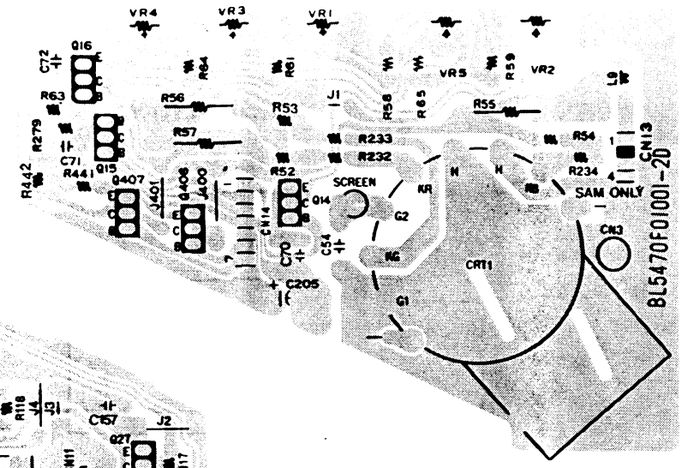


# 10. WIRING DIAGRAM

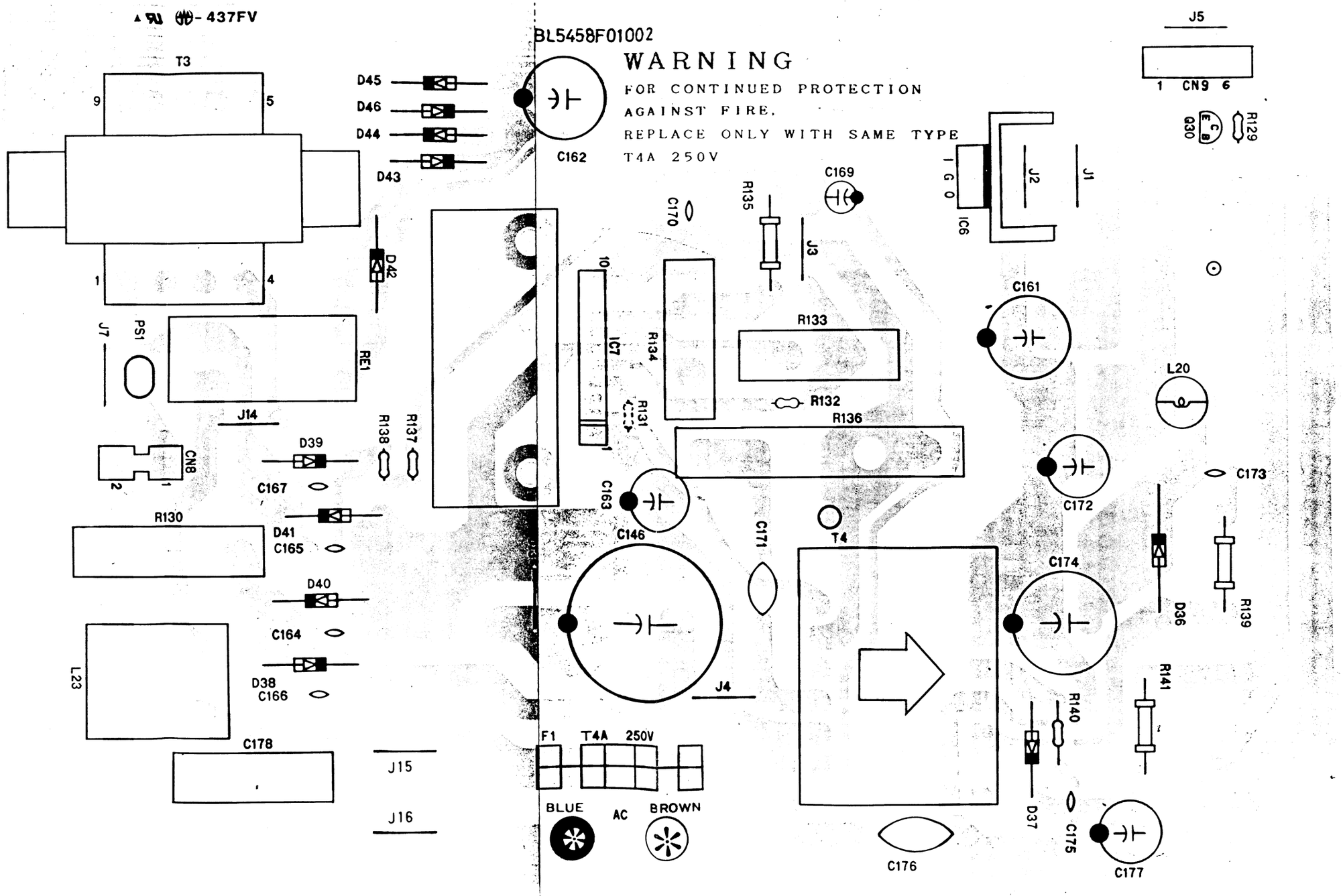


## MAIN PCB BOTTOM VIEW

## CRT PCB BOTTOM VIEW



# POWER SUPPLY PCB TOP VIEW



| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| C 147 | Ceramic ±10% 100pF/50V | 32B3101S or |
| | Ceramic ±10% 100pF/50V | 3B42101S |
| C 148 | Ceramic ±10% 100pF/50V | 32B3101S or |
| | Ceramic ±10% 100pF/50V | 3B42101S |
| C 149 | Ceramic ±10% 100pF/50V | 32B3101S or |
| | Ceramic ±10% 100pF/50V | 3B42101S |
| C 150 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 151 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 152 | Electrolytic 2.2uF/50V ±20% | 126F225S |
| C 153 | Ceramic ±10% 120pF/50V | 32B3121S or |
| | Ceramic ±10% 120pF/50V | 3B42121S |
| C 155 | Mylar 0.22uF/50V ±10% | 2250224M or |
| | Mylar 0.22uF/50V ±10% | 1250224 |
| C 156 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 157 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 158 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 159 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 160 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 179 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 202 | Electrolytic 10uF/16V ±20% | 126C106S |
| C 209 | Electrolytic 1uF/160V | 1220618 or |
| | Electrolytic 1uF/160V | 122Z329 |
| C 210 | Electrolytic 22uF/160V | 122Z334 or |
| | Electrolytic 22uF/160V ±20% | 6220758 |
| C 212 | Ceramic +80/-20% 0.022uF/25V | 32F3223 |
| C 216 | Electrolytic 2200uF/6.3V ±20% | 626A228 |
| C 217 | Ceramic 47pF/500V | 122Z684 |
| C 220 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 400 | Ceramic ±5% 56pF/50V | 3270560S or |
| | Ceramic ±5% 56pF/50V | 3S41560S |
| C 401 | Electrolytic 0.22uF/50V ±20% | 126F224S |
| C 402 | Ceramic ±10% 82pF/50V | 32B3820S or |
| | Ceramic ±10% 82pF/50V | 3B42820S |
| C 403 | Ceramic ±0.5% 10pF/50V | 3270100S or |
| | Ceramic ±5% 10pF/50V | 3S41100S |
| C 404 | Electrolytic 470uF/16V ±20% | 626C477 |
| C 405 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 406 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 407 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 408 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 409 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 410 | Electrolytic 4.7uF/25V ±20% | 126D475S |
| C 411 | Film 0.22uF/50V | 125U224 or |
| | Film 0.22uF/50V | 225R224 |
| C 412 | Film 0.22uF/50V | 125U224 or |
| | Film 0.22uF/50V | 225R224 |
| C 413 | Film 0.22uF/50V | 125U224 or |
| | Film 0.22uF/50V | 225R224 |
| C 414 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |
| C 415 | Semiconductive ±10% 0.047uF/25V | 12Y2473S |
| C 416 | Semiconductive ±10% 0.022uF/25V | 12Y2223S |
| C 417 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 418 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 419 | Electrolytic 220uF/16V ±20% | 126C227S |
| C 420 | Electrolytic 22uF/16V ±20% | 126C226S |
| C 421 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| C 422 | Film 0.22uF/50V | 125U224 or |
| | Film 0.22uF/50V | 225R224 |
| C 423 | Ceramic ±10% 0.0022uF/50V | 32B3222S or |
| | Ceramic 0.0022uF(YB) | 3X4D222S |
| C 424 | Electrolytic 0.47uF/50V ±20% | 126F474S |
| C 425 | Ceramic ±10% 0.001uF/50V | 32B3102S or |
| | Ceramic ±10% 0.001uF/50V | 3B42102S |
| C 426 | Semiconductive ±10% 0.15uF/25V | 12Y2154S |
| C 427 | Film 0.47uF/50V | 125U474 or |
| | Film 0.47uF/50V | 225U474 |
| C 430 | Electrolytic 47uF/16V ±20% | 126C476S |
| C 431 | Semiconductive ±10% 0.047uF/25V | 12Y2473S |
| C 432 | Ceramic NPO 75pF | 12CH750S |
| C 433 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 434 | Ceramic ±5% 27pF/50V | 32CH270S |
| C 435 | Ceramic ±10% 120pF/50V | 32B3121S or |
| | Ceramic ±10% 120pF/50V | 3B42121S |
| C 436 | Film 0.47uF/50V | 125U474 or |
| | Film 0.47uF/50V | 225U474 |
| C 437 | Ceramic ±10% 0.0056uF/25V | 32B3562S or |
| | Ceramic ±10% 0.0056uF/25V | 3X4D562S |
| C 438 | Ceramic ±10% 120pF/50V | 32B3121S or |
| | Ceramic ±10% 120pF/50V | 3B42121S |
| C 439 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 440 | Ceramic NPO 75pF | 12CH750S |
| C 441 | Ceramic ±10% 120pF/50V | 32B3121S or |
| | Ceramic ±10% 120pF/50V | 3B42121S |
| C 442 | Ceramic ±5% 22pF/50V | 32CH220S |
| C 443 | Mylar 0.1uF/50V ±10% | 2250104S or |
| | Mylar 0.1uF/50V ±10% | 1250104S |
| C 444 | Trimar 30pF/N750 | 1280123 |
| C 445 | Trimar 30pF/N750 | 1280123 |
| C 446 | Film 0.47uF/50V | 125U474 or |
| | Film 0.47uF/50V | 225U474 |
| C 447 | Ceramic +80/-20% 0.01uF/50V | 32F3103S or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103S |
| C 448 | Ceramic ±5% 22pF/50V | 3270220 or |
| | Ceramic ±5% 22pF/50V | 3S41220 |
| C 450 | Ceramic ±10% 220pF/50V | 32B3221 or |
| | Ceramic ±10% 220pF/50V | 3B42221 |
| | [for HT and GS Type CRT] | |
| | Ceramic ±10% 220pF/50V | 32B3221 or |
| | Ceramic ±10% 220pF/50V | 3B42221 |
| | [for SAM Type CRT] | |
| C 451 | Ceramic ±10% 0.001uF/50V | 32B3102S |
| C 454 | Ceramic +80/-20% 0.01uF/50V | 32F3103 or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103 |
| C 455 | Ceramic +80/-20% 0.01uF/50V | 32F3103 or |
| | Ceramic +80/-20% 0.01uF/25V | 3F45103 |
| | **DIODES** | |
| D 1 | Di. 1SS176TPA7 | 1SS176T or |
| | Di. 1SS133 | 1SS133T |
| D 2 | Di. 1SS176TPA7 | 1SS176T or |
| | Di. 1SS133 | 1SS133T |
| D 3 | Di. 1SS176TPA7 | 1SS176T or |
| | Di. 1SS133 | 1SS133T |
| D 4 | Di. 1SS176TPA7 | 1SS176T or |
| | Di. 1SS133 | 1SS133T |
| D 6 | Di. 1SS176TPA7 | 1SS176T or |
| | Di. 1SS133 | 1SS133T |

| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| D 7 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 8 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 9 | Di. | ERB44-08L3 | AERB4408L300 or |
| | Di. | RGP15KL5001 | RGP15KL5001 |
| D 10 | Led | SLR-55VC3 RED | 1401273 |
| D 13 | Di. | ERB44-08L3 | AERB4408L300 or |
| | Di. | RGP15KL5001 | RGP15KL5001 |
| D 14 | Di. | ERB44-08L3 | AERB4408L300 or |
| | Di. | RGP15KL5001 | RGP15KL5001 |
| D 15 | Di. | ERB44-08L3 | AERB4408L300 or |
| | Di. | RGP15KL5001 | RGP15KL5001 |
| D 16 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 19 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 20 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 21 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 22 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 24 | Di. | ERB12-02L3 | AERB1202L300 or |
| | Di. | GP10-4003 | MPL5209 |
| D 30 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 31 | Led | SLR-55VC3 RED | 1401273 |
| D 47 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 48 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 49 | Di. | 1SS176TPA7 | 1SS176T or |
| | Di. | 1SS133 | 1SS133T |
| D 50 | Di. | 1SS178 | 1SS178T or |
| | Di. | 1SS130 | 1SS130T |
| D 51 | Di. | 1SS176 | 1SS176 or |
| | Di. | 1SS133 | 1SS133 |
| D 52 | Di. | 1SS176 | 1SS176 or |
| | Di. | 1SS133 | 1SS133 |
| D 400 | Zener Di. | MTZ12B | MTZ12BT |
| | **ICS** | | |
| IC 1 | IC (LA7530N) | | 14LQ162 |
| IC 2 | IC | TC89101P | GTC89101P*** |
| IC 3 | IC | TMP47C 634N2458 | GCTS150***** |
| IC 4 | IC | BU4053B | 14LF166 or |
| | IC | | 14DW168 or |
| | IC | | MC14053BCP or |
| | IC | | 14L0436 |
| IC 8 | IC | AN5265 | 14LN160 |
| IC 9 | Voltage Regulator IC | AN78M12 | AM78M12F or |
| | Voltage Regulator IC | NJM78M12FA | 14L0242 |
| IC 10 | IC | LA7830 | 14LQ163 |
| IC 11 | IC | PST523C | 14L0174 |
| IC 12 | Voltage Regulator IC | AN78M09 | AN78M09 or |
| | IC | 78M09 | L78M09 |
| IC 14 | IC | L5631 | L5631 |
| IC 400 | IC | CXA1213S | GCXA1213S000 |
| IC 401 | IC | CXA1214P | GCXA1214P000 |

| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| | **COILS** | | |
| L 1 | Micro Inductor | 18uH | 2165180S or |
| | Micro Inductor | 18uH-K-5FT | 2162180S |
| L 2 | Casing Coil | | LFA07V*MM001 |
| L 3 | Casing Coil | | LFA07V*MM002 |
| L 4 | Micro Inductor | 8.2uH | 2165829S or |
| | Micro Inductor | 8.2uH | 2162829S |
| L 5 | Micro Inductor | 3.9uH-K-5FT | 2165399S or |
| | Micro Inductor | 3.9uH-K-5FT | 2162399S |
| L 6 | Micro Inductor | 2.7uH-K-5FT | 2165279S or |
| | Micro Inductor | 2.7uH-K-5FT | 2162279S |
| L 8 | Pot Type Coil | 47uH | LLBD**DMM001 or |
| | Pot Type Coil | 47uH | 117M511 |
| L 22 | Casing Coil | | 113M862 |
| L 25 | Pot Type Coil | 4.7MH | 117M957 |
| L 27 | H-Size Coil | | 1140097 or |
| | | | LLBB000AE005 |
| | [for SAM Type CRT] | | |
| L 400 | Micro Inductor | 33uH-K-5FT | 2165330S or |
| | Micro Inductor | 33uH-K-5FT | 2162330S |
| L 401 | Micro Inductor | 33uH-K-5FT | 2165330S or |
| | Micro Inductor | 33uH-K-5FT | 2162330S |
| L 402 | Casing Coil | | LFA07V0TK008 or |
| | Casing Coil | | LFA07V0MM011 |
| L 403 | Micro Inductor | 15uH | 2165150S or |
| | Micro Inductor | 15uH-K-5FT | 2162150S |
| L 404 | Casing Coil | | LFA07V0TK010 or |
| | Casing Coil | | LFA07V0MM004 |
| L 405 | Casing Coil | | LFA07V0TK009 or |
| | Casing Coil | | LFA07V0MM003 |
| L 406 | Micro Inductor | 15uH | 2165150S or |
| | Micro Inductor | 15uH-K-5FT | 2162150S |
| L 407 | Casing Coil | | LFA07V0TK010 or |
| | Casing Coil | | LFA07V0MM004 |
| L 408 | Micro Inductor | 8.2uH | 2165829S or |
| | Micro Inductor | 8.2uH | 2162829S |
| | **TRANSISTORS** | | |
| Q 1 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 2 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 3 | Tr. | 2SC3000(E) | 2SC3000EZ |
| Q 4 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 5 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |



| REF. NO. | | DESCRIPTION | PART NO. |
|---|---|---|---|
| Q 6 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 8 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 9 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 10 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 12 | Tr. | 2SC2271(D)-AEMP | 2SC2271DZ or |
| | Tr. | 2SC2271(E)-AEMP | 2SC2271EZ |
| Q 13 | Tr. | 2SD1398 | 2SD1398Z |
| Q 17 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 18 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 19 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 20 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 21 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |
| Q 22 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 23 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 24 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |

| REF. NO. | | DESCRIPTION | PART NO. |
|---|---|---|---|
| Q 25 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |
| Q 26 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |
| Q 27 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 28 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 29 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 34 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |
| Q 42 | Tr. | 2SA933(R) | 2SA933RZ or |
| | Tr. | 2SA933(S) | 2SA933SZ or |
| | Tr. | 2SA1318(T)-AANP | 2SA1318TZ or |
| | Tr. | 2SA1318(U)-AANP | 2SA1318UZ |
| Q 43 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 400 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 401 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 402 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 403 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 404 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |

| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| Q 405 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| Q 406 | Tr. | 2SC2621(D) | 2SC2621D or |
| | Tr. | 2SC2621(E) | 2SC2621E |
| Q 407 | Tr. | 2SC2621(D) | 2SC2621D or |
| | Tr. | 2SC2621(E) | 2SC2621E |
| Q 408 | Tr. | 2SC1740(R) | 2SC1740RZ or |
| | Tr. | 2SC1740(S) | 2SC1740SZ or |
| | Tr. | 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. | 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. | 2SC3331(U)-AANP | 2SC3331UZ |
| | RESISTORS | | |
| R 2 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 3 | Carbon Res. | 1/5W ±5% 180Ω | 1324181S or |
| | Carbon Res. | 1/6W ±5% 180Ω | 132A181S |
| R 4 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 5 | Carbon Res. | 1/5W ±5% 1.5KΩ | 1324152S or |
| | Carbon Res. | 1/6W ±5% 1.5KΩ | 132A152S |
| R 6 | Carbon Res. | 1/5W ±5% 3.9KΩ | 1324392S or |
| | Carbon Res. | 1/6W ±5% 3.9KΩ | 132A392S |
| R 7 | Carbon Res. | 1/5W ±5% 120KΩ | 1324124S or |
| | Carbon Res. | 1/6W ±5% 120KΩ | 132A124S |
| R 8 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 10 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 11 | Carbon Res. | 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. | 1/6W ±5% 68KΩ | 132A683S |
| R 12 | Carbon Res. | 1/5W ±5% 4.7KΩ | 1324472S or |
| | Carbon Res. | 1/6W ±5% 4.7KΩ | 132A472S |
| R 13 | Carbon Res. | 1/5W ±5% 3.9KΩ | 1324392S or |
| | Carbon Res. | 1/6W ±5% 3.9KΩ | 132A392S |
| R 14 | Carbon Res. | 1/5W ±5% 6.8KΩ | 1324682S or |
| | Carbon Res. | 1/6W ±5% 6.8KΩ | 132A682S |
| R 15 | Carbon Res. | 1/5W ±5% 5.6KΩ | 1324562S or |
| | Carbon Res. | 1/6W ±5% 5.6KΩ | 132A562S |
| R 16 | Carbon Res. | 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. | 1/6W ±5% 3.3KΩ | 132A332S |
| R 17 | Carbon Res. | 1/5W ±5% 6.8KΩ | 1324682S or |
| | Carbon Res. | 1/6W ±5% 6.8KΩ | 132A682S |
| R 18 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 19 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 20 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 21 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 22 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 23 | Carbon Res. | 1/5W ±5% 4.7KΩ | 1324472S or |
| | Carbon Res. | 1/6W ±5% 4.7KΩ | 132A472S |
| R 26 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 28 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |

| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| R 29 | Carbon Res. | 1/5W ±5% 680Ω | 1324681S or |
| | Carbon Res. | 1/6W ±5% 680Ω | 132A681S |
| R 30 | Carbon Res. | 1/5W ±5% 68Ω | 1324680S or |
| | Carbon Res. | 1/6W ±5% 68Ω | 132A680S |
| R 31 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 36 | Carbon Res. | 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. | 1/6W ±5% 3.3KΩ | 132A332S |
| R 37 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 38 | Carbon Res. | 1/5W ±5% 4.7KΩ | 1324472S or |
| | Carbon Res. | 1/6W ±5% 4.7KΩ | 132A472S |
| R 39 | Carbon Res. | 1/5W ±5% 22KΩ | 1324223S or |
| | Carbon Res. | 1/6W ±5% 22KΩ | 132A223S |
| R 40 | Carbon Res. | 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. | 1/6W ±5% 100KΩ | 132A104S |
| R 41 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 42 | Carbon Res. | 1/5W ±5% 1.5KΩ | 1324152S or |
| | Carbon Res. | 1/6W ±5% 1.5KΩ | 132A152S |
| R 43 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 44 | Carbon Res. | 1/5W ±5% 4.7Ω | 1324479S or |
| | Carbon Res. | 1/6W ±5% 4.7Ω | 132A479S |
| R 45 | Metal Res. | 680Ω 1W | 534A681 |
| R 46 | Carbon Res. | 1/4W ±5% 1KΩ | 1345102S |
| | Carbon Res. | 1/5W ±5% 1KΩ [for HT and GS Type CRT] | 1324102S |
| | Carbon Res. | 1/4W ±5% 5.6KΩ | 1345562S |
| | Carbon Res. | 1/5W ±5% 5.6KΩ [for SAM Type CRT] | 1324562S |
| R 47 | Carbon Res. | 1/5W ±5% 39KΩ | 1324393S or |
| | Carbon Res. | 1/6W ±5% 39KΩ | 132A393S |
| R 48 | Carbon Res. | 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. | 1/6W ±5% 3.3KΩ | 132A332S |
| R 49 | Carbon Res. | 1/4W ±5% 1Ω | 1345109S or |
| | Carbon Res. | 1/5W ±5% 1Ω | 1324109S |
| R 50 | Carbon Res. | 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. | 1/6W ±5% 68KΩ | 132A683S |
| R 51 | Carbon Res. | 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. | 1/6W ±5% 1.8KΩ | 132A182S |
| R 58 | Carbon Res. | 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. | 1/6W ±5% 1.8KΩ | 132A182S |
| R 59 | Carbon Res. | 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. | 1/6W ±5% 220Ω | 132A221S |
| R 61 | Carbon Res. | 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. | 1/6W ±5% 1.8KΩ | 132A182S |
| R 63 | Carbon Res. | 1/5W ±5% 820Ω | 1324821S or |
| | Carbon Res. | 1/6W ±5% 820Ω | 132A821S |
| R 65 | Carbon Res. | 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. | 1/6W ±5% 220Ω | 132A221S |
| R 66 | Fuse Res. | 2.2Ω 1W ±5% | 5363229 or |
| | Fuse Res. | 2.2Ω 1W ±5% | 5368229 |
| R 67 | Fuse Res. | 2.2Ω 1W ±5% | 5363229 or |
| | Fuse Res. | 2.2Ω 1W ±5% | 5368229 |
| R 68 | Fuse Res. | 1/2W ±5% 1Ω | 5362109 or |
| | Fuse Res. | 1/2W ±5% 1Ω | 5367109 |
| R 69 | Cement Res. | 3.9Ω 5W | 1330734 or |
| | Cement Res. | 3.9Ω 5W | 1330900 |
| R 70 | Metal Res. | 3.3KΩ 3W | 5330879 or |
| | Metal Res. | 3.3KΩ 3W | 5330667 |
| R 71 | Metal Res. | 3.9KΩ 3W | 5330880 or |
| | Metal Res. | 3.9KΩ 3W | 5330668 |



| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| R 72 | Carbon Res. | 1/4W ±5% 1.5KΩ | 1345152S or |
| | Carbon Res. | 1/5W ±5% 1.5KΩ | 1324152S |
| R 73 | Carbon Res. | 1/5W ±5% 56KΩ | 1324563S or |
| | Carbon Res. | 1/6W ±5% 56KΩ | 132A563S |
| R 74 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 75 | Carbon Res. | 1/5W ±5% 82KΩ | 1324823S or |
| | Carbon Res. | 1/6W ±5% 82KΩ | 132A823S |
| R 78 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 79 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 80 | Carbon Res. | 1/5W ±5% 180Ω | 1324181S or |
| | Carbon Res. | 1/6W ±5% 180Ω | 132A181S |
| R 82 | Carbon Res. | 1/5W ±5% 330Ω | 1324331S or |
| | Carbon Res. | 1/6W ±5% 330Ω | 132A331S |
| R 83 | Carbon Res. | 1/5W ±5% 680Ω | 1324681S or |
| | Carbon Res. | 1/6W ±5% 680Ω | 132A681S |
| R 84 | Carbon Res. | 1/5W ±5% 5.6KΩ | 1324562S or |
| | Carbon Res. | 1/6W ±5% 5.6KΩ | 132A562S |
| R 85 | Carbon Res. | 1/5W ±5% 180KΩ | 1324184S or |
| | Carbon Res. | 1/6W ±5% 180KΩ | 132A184S |
| R 86 | Carbon Res. | 1/5W ±5% 27Ω | 1324270S or |
| | Carbon Res. | 1/6W ±5% 27Ω | 132A270S |
| R 87 | Carbon Res. | 1/5W ±5% 1.5KΩ | 1324152S or |
| | Carbon Res. | 1/6W ±5% 1.5KΩ | 132A152S |
| R 88 | Carbon Res. | 1/5W ±5% 68Ω | 1324680S or |
| | Carbon Res. | 1/6W ±5% 68Ω | 132A680S |
| R 90 | Carbon Res. | 1/5W ±5% 82KΩ | 1324823S or |
| | Carbon Res. | 1/6W ±5% 82KΩ | 132A823S |
| R 91 | Carbon Res. | 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. | 1/6W ±5% 1.8KΩ | 132A182S |
| R 92 | Carbon Res. | 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. | 1/6W ±5% 1.8KΩ | 132A182S |
| R 93 | Carbon Res. | 1/5W ±5% 5.6KΩ | 1324562S or |
| | Carbon Res. | 1/6W ±5% 5.6KΩ | 132A562S |
| R 94 | Carbon Res. | 1/5W ±5% 390Ω | 1324391S or |
| | Carbon Res. | 1/6W ±5% 390Ω | 132A391S |
| R 95 | Carbon Res. | 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. | 1/6W ±5% 270Ω | 132A271S |
| R 96 | Carbon Res. | 1/5W ±5% 470Ω | 1324471S or |
| | Carbon Res. | 1/6W ±5% 470Ω | 132A471S |
| R 97 | Carbon Res. | 1/5W ±5% 470Ω | 1324471S or |
| | Carbon Res. | 1/6W ±5% 470Ω | 132A471S |
| R 98 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 100 | Carbon Res. | 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. | 1/6W ±5% 1KΩ | 132A102S |
| R 101 | Carbon Res. | 1/5W ±5% 560KΩ | 1324564S or |
| | Carbon Res. | 1/6W ±5% 560KΩ | 132A564S |
| R 102 | Carbon Res. | 1/5W ±5% 470KΩ | 1324474S or |
| | Carbon Res. | 1/6W ±5% 470KΩ | 132A474S |
| R 103 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 104 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 105 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 106 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 107 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |

| REF. NO. | DESCRIPTION | | PART NO. |
|---|---|---|---|
| R 108 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 109 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 110 | Carbon Res. | 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. | 1/6W ±5% 47KΩ | 132A473S |
| R 111 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 112 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 113 | Carbon Res. | 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. | 1/6W ±5% 47KΩ | 132A473S |
| R 114 | Carbon Res. | 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. | 1/6W ±5% 47KΩ | 132A473S |
| R 115 | Metal Res. | 1W ±5% 15KΩ | 534A153 |
| R 116 | Carbon Res. | 1/5W ±5% 15KΩ | 1324153S or |
| | Carbon Res. | 1/6W ±5% 15KΩ | 132A153S |
| R 117 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 118 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 119 | Carbon Res. | 1/5W ±5% 2.4KΩ | 1324242S or |
| | Carbon Res. | 1/6W ±5% 2.4KΩ | 132A242S |
| R 120 | Carbon Res. | 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. | 1/6W ±5% 68KΩ | 132A683S |
| R 121 | Carbon Res. | 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. | 1/6W ±5% 68KΩ | 132A683S |
| R 122 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 123 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 124 | Carbon Res. | 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. | 1/6W ±5% 220Ω | 132A221S |
| R 125 | Carbon Res. | 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. | 1/6W ±5% 68KΩ | 132A683S |
| R 126 | Carbon Res. | 1/5W ±5% 100Ω | 1324101S or |
| | Carbon Res. | 1/6W ±5% 100Ω | 132A101S |
| R 127 | Carbon Res. | 1/5W ±5% 100Ω | 1324101S or |
| | Carbon Res. | 1/6W ±5% 100Ω | 132A101S |
| R 128 | Carbon Res. | 1/5W ±5% 100Ω | 1324101S or |
| | Carbon Res. | 1/6W ±5% 100Ω | 132A101S |
| R 142 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 143 | Carbon Res. | 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. | 1/6W ±5% 10KΩ | 132A103S |
| R 144 | Carbon Res. | 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. | 1/6W ±5% 3.3KΩ | 132A332S |
| R 145 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 146 | Carbon Res. | 1/5W ±5% 2.7KΩ | 1324272S or |
| | Carbon Res. | 1/6W ±5% 2.7KΩ | 132A272S |
| R 147 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 148 | Carbon Res. | 1/5W ±5% 8.2KΩ | 1324822S or |
| | Carbon Res. | 1/6W ±5% 8.2KΩ | 132A822S |
| R 149 | Carbon Res. | 1/5W ±5% 22KΩ | 1324223S or |
| | Carbon Res. | 1/6W ±5% 22KΩ | 132A223S |
| R 150 | Carbon Res. | 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. | 1/6W ±5% 33KΩ | 132A333S |
| R 151 | Carbon Res. | 1/5W ±5% 8.2KΩ | 1324822S or |
| | Carbon Res. | 1/6W ±5% 8.2KΩ | 132A822S |
| R 152 | Carbon Res. | 1/5W ±5% 1.2KΩ | 1324122S or |
| | Carbon Res. | 1/6W ±5% 1.2KΩ | 132A122S |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| R 153 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 154 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 155 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 156 | Carbon Res. 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. 1/6W ±5% 1KΩ | 132A102S |
| R 157 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 158 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 159 | Carbon Res. 1/5W ±5% 180KΩ | 1324184S or |
| | Carbon Res. 1/6W ±5% 180KΩ | 132A184S |
| R 160 | Carbon Res. 1/5W ±5% 39KΩ | 1324393S or |
| | Carbon Res. 1/6W ±5% 39KΩ | 132A393S |
| R 161 | Carbon Res. 1/5W ±5% 68KΩ | 1324683S or |
| | Carbon Res. 1/6W ±5% 68KΩ | 132A683S |
| R 164 | Carbon Res. 1/2W ±5% 10KΩ | 1322103 |
| R 184 | Carbon Res. 1/5W ±5% 2.7KΩ | 1324272S or |
| | Carbon Res. 1/6W ±5% 2.7KΩ | 132A272S |
| R 193 | Carbon Res. 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. 1/6W ±5% 33KΩ | 132A333S |
| R 207 | Carbon Res. 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. 1/6W ±5% 33KΩ | 132A333S |
| R 208 | Carbon Res. 1/5W ±5% 2.7KΩ | 1324272S or |
| | Carbon Res. 1/6W ±5% 2.7KΩ | 132A272S |
| R 211 | Carbon Res. 1/5W ±5% 2.2KΩ | 1324222S or |
| | Carbon Res. 1/6W ±5% 2.2KΩ | 132A222S |
| R 229 | Carbon Res. 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. 1/6W ±5% 1KΩ | 132A102S |
| R 231 | Fuse Res. 68Ω 1/2W | 5362680 or |
| | Fuse Res. 68Ω 1/2W | 5367680 |
| R 235 | Carbon Res. 1/4W ±5% 1.8KΩ | 1345182S or |
| | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S |
| R 240 | Fuse Res. 1/2W ±5% 1Ω | 5362109 or |
| | Fuse Res. 1/2W ±5% 1Ω | 5367109 |
| R 253 | Carbon Res. 1/5W ±5% 1.5KΩ | 1324152S or |
| | Carbon Res. 1/6W ±5% 1.5KΩ | 132A152S |
| R 254 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 255 | Carbon Res. 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. 1/6W ±5% 47KΩ | 132A473S |
| R 258 | Carbon Res. 1/5W ±5% 12KΩ | 1324123S or |
| | Carbon Res. 1/6W ±5% 12KΩ | 132A123S |
| R 259 | Carbon Res. 1/5W ±5% 82KΩ | 1324823S or |
| | Carbon Res. 1/6W ±5% 82KΩ | 132A823S |
| R 260 | Carbon Res. 1/5W ±5% 2.7KΩ | 1324272S or |
| | Carbon Res. 1/6W ±5% 2.7KΩ | 132A272S |
| R 261 | Carbon Res. 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. 1/6W ±5% 3.3KΩ | 132A332S |
| R 262 | Carbon Res. 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. 1/6W ±5% 3.3KΩ | 132A332S |
| R 266 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 270 | Carbon Res. 1/4W ±5% 2.2Ω | 1345229S or |
| | Carbon Res. 1/5W ±5% 2.2Ω | 1324229S |
| R 271 | Carbon Res. 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. 1/6W ±5% 1KΩ | 132A102S |
| R 274 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 279 | Carbon Res. 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. 1/6W ±5% 220Ω | 132A221S |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| R 282 | Carbon Res. 1/5W ±5% 2.2KΩ | 1324222S or |
| | Carbon Res. 1/6W ±5% 2.2KΩ | 132A222S |
| R 310 | Carbon Res. 1/5W ±5% 33KΩ | 1324333S or |
| | Carbon Res. 1/6W ±5% 33KΩ | 132A333S |
| R 400 | Carbon Res. 1/5W ±5% 1.5KΩ | 1324152S or |
| | Carbon Res. 1/6W ±5% 1.5KΩ | 132A152S |
| R 401 | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. 1/6W ±5% 1.8KΩ | 132A182S |
| R 402 | Carbon Res. 1/5W ±5% 100KΩ | 1324104 or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104 |
| R 403 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 404 | Carbon Res. 1/5W ±5% 820Ω | 1324821S or |
| | Carbon Res. 1/6W ±5% 820Ω | 132A821S |
| R 405 | Carbon Res. 1/5W ±5% 2.7KΩ | 1324272S or |
| | Carbon Res. 1/6W ±5% 2.7KΩ | 132A272S |
| R 406 | Carbon Res. 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. 1/6W ±5% 3.3KΩ | 132A332S |
| R 407 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 408 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 410 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 411 | Carbon Res. 1/5W ±5% 180Ω | 1324181S or |
| | Carbon Res. 1/6W ±5% 180Ω | 132A181S |
| R 412 | Carbon Res. 1/5W ±5% 4.7KΩ | 1324472S or |
| | Carbon Res. 1/6W ±5% 4.7KΩ | 132A472S |
| R 413 | Carbon Res. 1/5W ±5% 470Ω | 1324471S or |
| | Carbon Res. 1/6W ±5% 470Ω | 132A471S |
| R 414 | Carbon Res. 1/5W ±5% 330Ω | 1324331S or |
| | Carbon Res. 1/6W ±5% 330Ω | 132A331S |
| R 415 | Carbon Res. 1/5W ±5% 5.6KΩ | 1324562S or |
| | Carbon Res. 1/6W ±5% 5.6KΩ | 132A562S |
| R 416 | Carbon Res. 1/5W ±5% 330KΩ | 1324334S or |
| | Carbon Res. 1/6W ±5% 330KΩ | 132A334S |
| R 417 | Metal Res. 6.8KΩ 3W | RN03682KE002 or |
| | Metal Res. 6.8KΩ 3W | RN03682KA001 |
| R 418 | Carbon Res. 1/5W ±5% 1KΩ | 1324102S or |
| | Carbon Res. 1/6W ±5% 1KΩ | 132A102S |
| R 419 | Carbon Res. 1/5W ±5% 470Ω | 1324471S or |
| | Carbon Res. 1/6W ±5% 470Ω | 132A471S |
| R 420 | Carbon Res. 1/5W ±5% 390Ω | 1324391S or |
| | Carbon Res. 1/6W ±5% 390Ω | 132A391S |
| R 421 | Carbon Res. 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. 1/6W ±5% 47KΩ | 132A473S |
| R 422 | Carbon Res. 1/5W ±5% 22KΩ | 1324223S or |
| | Carbon Res. 1/6W ±5% 22KΩ | 132A223S |
| R 423 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 424 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 425 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 426 | Carbon Res. 1/5W ±5% 390Ω | 1324391S or |
| | Carbon Res. 1/6W ±5% 390Ω | 132A391S |
| R 427 | Carbon Res. 1/5W ±5% 3.3MΩ | 1324335S or |
| | Carbon Res. 1/6W ±5% 3.3MΩ | 132A335S |
| R 428 | Carbon Res. 1/5W ±5% 47KΩ | 1324473S or |
| | Carbon Res. 1/6W ±5% 47KΩ | 132A473S |
| R 429 | Metallzed Film Res. 1/5W F 27KΩ | 13C2702 |
| R 430 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |



| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| R 432 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 433 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 434 | Carbon Res. 1/5W ±5% 390Ω | 1324391S or |
| | Carbon Res. 1/6W ±5% 390Ω | 132A391S |
| R 436 | Carbon Res. 1/5W ±5% 470Ω | 1324471S or |
| | Carbon Res. 1/6W ±5% 470Ω | 132A471S |
| R 437 | Carbon Res. 1/5W ±5% 390Ω | 1324391S or |
| | Carbon Res. 1/6W ±5% 390Ω | 132A391S |
| R 438 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 439 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 440 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 441 | Carbon Res. 1/4W ±5% 470Ω | 1345471S |
| R 442 | Carbon Res. 1/4W ±5% 470Ω | 1345471S |
| R 443 | Carbon Res. 1/5W ±5% 100KΩ | 1324104S or |
| | Carbon Res. 1/6W ±5% 100KΩ | 132A104S |
| R 444 | Carbon Res. 1/5W ±5% 680KΩ | 1324684S or |
| | Carbon Res. 1/6W ±5% 680KΩ | 132A684S |
| R 445 | Carbon Res. 1/5W ±5% 3.3KΩ | 1324332S or |
| | Carbon Res. 1/6W ±5% 3.3KΩ | 132A332S |
| R 446 | Carbon Res. 1/5W ±5% 270Ω | 1324271S or |
| | Carbon Res. 1/6W ±5% 270Ω | 132A271S |
| R 447 | Carbon Res. 1/5W ±5% 4.7KΩ | 1324472S or |
| | Carbon Res. 1/6W ±5% 4.7KΩ | 132A472S |
| R 449 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 450 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 451 | Carbon Res. 1/5W ±5% 10KΩ | 1324103 or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103 |
| R 452 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| R 453 | Carbon Res. 1/5W ±5% 10KΩ | 1324103S or |
| | Carbon Res. 1/6W ±5% 10KΩ | 132A103S |
| | **SWITCHES** | |
| SW 1 | Slide | 1621654 or |
| | Slide | SSS0202WM001 |
| SW 2 | Tact | 5622172 |
| SW 3 | Tact | 5622172 |
| SW 4 | Tact | 5622172 |
| SW 5 | Tact | 5622172 |
| SW 6 | Tact | 5622172 |
| SW 7 | Tact | 5622172 |
| SW 8 | Tact | 5622172 |
| SW 9 | Tact | 5622172 |
| SW 10 | Tact | 5622172 |
| | **VOLUMES** | |
| VR 13 | P.O.T 10KOHM B | 638A103 or |
| | Semi Fixed Res. 10KΩ B | 1380707 |
| VR 400 | Semi Fixed Res. KVSF637AO-B203 | 638A223 or |
| | P.O.T. 20KΩ B | 1380709 |
| VR 401 | P.O.T. 470Ω B | 638A471 or |
| | P.O.T. 500Ω B | 1380712 |
| VR 402 | P.O.T. 47KΩ B | 638A473 or |
| | Semi Fixed Res. 50KΩ B | 1380704 |
| VR 403 | P.O.T. 470Ω B | 638A471 or |
| | P.O.T. 500Ω B | 1380712 |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| | **MISCELLANEOUS** | |
| T 1 | H.Drive Trans | 1150325 |
| T 2 ⚠ | F.B.T. FCM-20B010 | 1813481 |
| U 1 | Remocon Receive Unit | USESJRSKK001 or |
| | Remocon Receive Unit | 1813042 |
| U 2 | Tuner Unit TUFNF3H-291 | 1813591 |
| CF 1 | Ceramic Filter SFE6.5MB | 1813595 |
| CF 2 | Ceramic Filter SFE5.5MBF | 1812018 |
| CF 3 | Ceramic Discre CDA6.5MC26 | 1813594 |
| CF 4 | Ceramic Discre CDA5.5MC26 | 1812020 |
| CF 5 | Ceramic Trap TPW02B | 1813593 |
| CF 6 | Saw Filter SAF38.0MZ70Z | 1813592 |
| CF 7 | X'tal 4.194304MHz | 1811369 or |
| | X'tal 4.194304MHz | 1811214 |
| CF 400 | Ceramic Resonator (CSB500F2) | 1812039 |
| CF 401 | X'tal 4.43MHz | 1811387 |
| CF 402 | X'tal 3.58MHz | 1811291 |
| CN 1 | Connector Base 2P | 1770258 |
| CN 2 | Connector Base 5P RTB-1.5-5V | 1780168 or |
| | Connector Base 5P TV-50P-05-V1 | 1730813 or |
| | Connector Base 5P W-P3005-02 | 1730812 |
| CN 3 | Connector Pin 1P | 1730688 |
| CN 9 | Connector Base 6P | 5700108 |
| CN 11 | Pin Plug Cord | 1760613 |
| CN 20 | Angle Pin Header 8P IL-S- 8P-S2L2-EF | 1740781 |
| CN 21 | Connector Base 21P | 1630367 or |
| | Connector Base 21P | JGZJ210SR001 |
| DE 400 | Delay Line | 113N852 or |
| | Delay Line | LFB10V0SF001 |
| DE 401 | Glass Delay | 1813554 or |
| | Glass Delay | 1812056 |
| JA 1 | IEC Antenna Jack | 1780292 or |
| | IEC Ant.Jack TCR-RCA-2VW | 1780284 |
| JA 2 | BNC Jack | 1780202 |
| JA 3 | RCA Jack YKB11-0478 | 1780237 |
| JA 4 | BNC Jack | 1780202 |
| JA 5 | RCA Jack YKB11-0478 | 1780237 |
| | Wire Ass'y CE5400-01 | CE5400-01 |
| | Wire Ass'y WX1L5402-001 | WX1L5402-001 |
| | Wire Ass'y WX1L5464-001 | WX1L5464-001 |
| | Wire Ass'y WX1L5470-001 | WX1L5470-001 |
| | Wire Lead WX3301A6FF10 | WX3301A6FF10 |
| | Wire Lead WX3901A6FF08 | WX3901A6FF08 |
| | Wire Lead WX3601A63316 | WX3601A63316 |
| | Heat Sink Sheet | XJ0Z000DB001 |
| | Heat Sink A EM41434 | 0EM400378 |
| | Heat Sink D EM41436 | 0EM400380 |
| | Heat Sink B K42428 | 8S00362 |
| | Lead Clamper | 1790256 |
| | Lead Clamper | 1790356 |
| | PIN (Test) | 1700093 |
| | PIN (Test) | 1740354 |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| | ASS'Y, PCB, CRT<br>CONSISTS OF THE FOLLOWING: | BL5470F01001-B |
| | **CAPACITORS** | |
| C 54 | Ceramic 0.01uF/2KV | 6220602 |
| C 70 | Ceramic ±10% 220pF/50V | 32B3221S or |
| | Ceramic ±10% 220pF/50V | 3B42221S |
| C 71 | Ceramic ±10% 270pF/50V | 32B3271S or |
| | Ceramic ±10% 270pF/50V | 3B42271S |
| C 72 | Ceramic ±10% 220pF/50V | 32B3221S or |
| | Ceramic ±10% 220pF/50V | 3B42221S |
| C 205 | Electrolytic 10uF/16V ±20% | 126C106S |
| | **COILS** | |
| L 9 | Micro Inductor 180uH | 2165181S or |
| | Micro Inductor 180uH-K-5FT | 2162181S |
| | **TRANSISTORS** | |
| Q 14 | Tr. 2SC2621(D) | 2SC2621D or |
| | Tr. 2SC2621(E) | 2SC2621E |
| Q 15 | Tr. 2SC2621(D) | 2SC2621D or |
| | Tr. 2SC2621(E) | 2SC2621E |
| Q 16 | Tr. 2SC2621(D) | 2SC2621D or |
| | Tr. 2SC2621(E) | 2SC2621E |
| | **RESISTORS** | |
| R 52 | Carbon Res. 1/4W ±5% 1.5KΩ | 1345152S or |
| | Carbon Res. 1/5W ±5% 1.5KΩ | 1324152S |
| R 53 | Carbon Res. 1/4W ±5% 1.5KΩ | 1345152S or |
| | Carbon Res. 1/5W ±5% 1.5KΩ | 1324152S |
| R 54 | Carbon Res. 1/4W ±5% 1.5KΩ | 1345152S or |
| | Carbon Res. 1/5W ±5% 1.5KΩ | 1324152S |
| R 55 | Metal Res. 1W ±5% 15KΩ | 534A153 |
| R 56 | Metal Res. 1W ±5% 15KΩ | 534A153 |
| R 57 | Metal Res. 1W ±5% 15KΩ | 534A153 |
| R 58 | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. 1/6W ±5% 1.8KΩ | 132A182S |
| R 59 | Carbon Res. 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. 1/6W ±5% 220Ω | 132A221S |
| R 61 | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. 1/6W ±5% 1.8KΩ | 132A182S |
| R 63 | Carbon Res. 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. 1/6W ±5% 220Ω | 132A221S |
| R 64 | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S or |
| | Carbon Res. 1/6W ±5% 1.8KΩ | 132A182S |
| R 65 | Carbon Res. 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. 1/6W ±5% 220Ω | 132A221S |
| R 232 | Carbon Res. 1/4W ±5% 1.8KΩ | 1345182S or |
| | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S |
| R 233 | Carbon Res. 1/4W ±5% 1.8KΩ | 1345182S or |
| | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S |
| R 234 | Carbon Res. 1/4W ±5% 1.8KΩ | 1345182S or |
| | Carbon Res. 1/5W ±5% 1.8KΩ | 1324182S |
| R 279 | Carbon Res. 1/5W ±5% 220Ω | 1324221S or |
| | Carbon Res. 1/6W ±5% 220Ω | 132A221S |
| | **VOLUMES** | |
| VR 1 | P.O.T. 4.7KΩ B | 138A957 or |
| | P.O.T. 5KΩ B | 1380851 |
| VR 2 | P.O.T. 470Ω B | 138A951 or |
| | Semi Fixed Res. 500(B) | 1380849 |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| VR 3 | P.O.T. 4.7KΩ B | 138A957 or |
| | P.O.T. 5KΩ B | 1380851 |
| VR 4 | P.O.T. 4.7KΩ B | 138A957 or |
| | P.O.T. 5KΩ B | 1380851 |
| VR 5 | P.O.T. 470Ω B | 138A951 or |
| | Semi Fixed Res. 500(B) | 1380849 |
| | **MISCELLANOUS** | |
| CRT 1 | CRT Socket | JSCC290HD003 or |
| | CRT Socket | 1780246 |
| CN 3 | Connector Pin 1P RT-01N-2.3A | 1730688 |
| ⚠ | ASS'Y, PCB, POWER<br>CONSISTS OF THE FOLLOWING: | BL5410F01002 |
| | **CAPACITORS** | |
| C146 | Electrolytic 150uF/400V | 122Z020 or |
| | Electrolytic 150uF/400V | 1220891 or |
| | Electrolytic 150uF/400V | 1220893 |
| C 161 | Electrolytic 1000uF/6.3V ±20% | 626A108 |
| C 162 | Electrolytic 1000uF/16V ±20% | 626C108 |
| C 163 | Electrolytic 10uF 160V | 122Z333 or |
| | Electrolytic 10uF/160V | 6220759 |
| C 164 ⚠ | Ceramic 0.0047uF AC400V F | 6220353 |
| C 165 ⚠ | Ceramic 0.0047uF AC400V F | 6220353 |
| C 166 ⚠ | Ceramic 0.0047uF AC400V F | 6220353 |
| C 167 ⚠ | Ceramic 0.0047uF AC400V F | 6220353 |
| C 169 | Electrolytic 1uF/50V ±20% | 126F105S |
| C 170 | Ceramic 470pF/1KV | 6220487 |
| C 171 | Ceramic 0.0033uF/1KV | 6220577 |
| C 172 | Electrolytic 22uF/160V | 122Z334 or |
| | Electrolytic 22uF/160V ±20% | 6220758 |
| C 173 | Ceramic 0.001uF/1KV | 6220574 |
| C 174 | Electrolytic 100uF/160V ±20% | 122Z337 or |
| | Electrolytic 100uF/160V | 6220688 or |
| | Electrolytic 100uF/160V | 1220601 |
| C 175 | Ceramic 0.001uF/1KV | 6220574 |
| C 176 ⚠ | Ceramic ±20% 4700pF/4KV | 122Z013 |
| C 177 | Electrolytic 470uF/16V ±20% | 626C477 |
| C 178 ⚠ | Line Across 0.1uF/250V | 1220756 or |
| ⚠ | Line Across 0.1uF/250V | 122Z181 or |
| ⚠ | Line Across 0.1uF/250V | 622Z631 |
| | **DIODES** | |
| D 36 | Di. ERD28-06L | AERD2806L000 or |
| | Di. RGP30GL | RGP30G5001L |
| D 37 | Di. ERB44-08L3 | AERB4408L300 or |
| | Di. RGP15KL5001 | RGP15KL5001 |
| D 38 | Di. ERC05-10L3 | AERC0510L300 or |
| | Di. GP15ML5014 | GP15ML5014 |
| D 39 | Di. ERC05-10L3 | AERC0510L300 or |
| | Di. GP15ML5014 | GP15ML5014 |
| D 40 | Di. ERC05-10L3 | AERC0510L300 or |
| | Di. GP15ML5014 | GP15ML5014 |
| D 41 | Di. ERC05-10L3 | AERC0510L300 or |
| | Di. GP15ML5014 | GP15ML5014 |
| D 42 | Di. ERA15-02PNRB | AERA1502PNRB or |
| | Di. GP104003EG16 | GP104003EG16 |



| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| D 43 | Di. ERA15-02PNRB | AERA1502PNRB or |
| | Di. GP104003EG16 | GP104003EG16 |
| D 44 | Di. ERA15-02PNRB | AERA1502PNRB or |
| | Di. GP104003EG16 | GP104003EG16 |
| D 45 | Di. ERA15-02PNRB | AERA1502PNRB or |
| | Di. GP104003EG16 | GP104003EG16 |
| D 46 | Di. ERA15-02PNRB | AERA1502PNRB or |
| | Di. GP104003EG16 | GP104003EG16 |
| | **ICS** | |
| IC 6 | IC 78M06 | AN78M06 or |
| | IC 78M06 | L78M06 |
| IC 7 ⚠ | Power IC (STK7348) | 14LQ203 or |
| ⚠ | IC STK7348 | STK7348 |
| | **COILS** | |
| L 20 | Pot Type Coil 47uH | LLBD**DMM001 |
| L 23 ⚠ | Line Filter | 1812745 or |
| ⚠ | Line Filter | LLBG000TE002 |
| | **TRANSISTORS** | |
| Q 30 | Tr. 2SC1740(R) | 2SC1740RZ or |
| | Tr. 2SC1740(S) | 2SC1740SZ or |
| | Tr. 2SC1815(GR)-TPE2 | 2SC1815GRZ or |
| | Tr. 2SC3331(T)-AANP | 2SC3331TZ or |
| | Tr. 2SC3331(U)-AANP | 2SC3331UZ |
| | **RESISTORS** | |
| R 129 | Carbon Res. 1/4W ±5% 3.3KΩ | 1345332S or |
| | Carbon Res. 1/5W ±5% 3.3KΩ | 1324332S |
| R 130 | Cement Res. 3.9Ω 7W | 1330954 |
| R 131 | Carbon Res. 1/4W ±5% 56KΩ | 1345563 or |
| | Carbon Res. 1/5W ±5% 56KΩ | 1324563 |
| | [for SAM and CPT Type CRT] | |
| R 132 | Carbon Res. 1/4W ±5% 1KΩ | 1345102S or |
| | Carbon Res. 1/5W ±5% 1KΩ | 1324102S |
| R 133 | Cement Res. BGR3X-270(27/3W) | 1330703 or<br>RW03270UB001 |
| R 134 | Cement Res. 3W ±10% 1.5Ω | 1330702 or<br>RW03159UB001 |
| R 135 | Metal Res. 1W ±5% 33Ω | 534A330 |
| R 136 | Cement Res. 33Ω 10W | 1330955 |
| R 137 | Carbon Res. 270KΩ 1/4W | 1345274S or |
| | Carbon Res. 1/5W ±5% 270KΩ | 1324274S |
| R 138 | Carbon Res. 270KΩ 1/4W | 1345274S or |
| | Carbon Res. 1/5W ±5% 270KΩ | 1324274S |
| R 139 | Metal Res. 2W ±5% 15Ω | 534B150 |
| R 140 | Fuse Res. 1/4W ±5% 15Ω | 5366150 |
| R 141 | Metal Res. 2.2Ω 1W | 534A229 |
| | **MISCELLANEOUS** | |
| RE 1 ⚠ | Power Relay | 1680167 or |
| ⚠ | Power Relay | 1680178 or |
| ⚠ | Power Relay | MRPDC9ZQN001 |
| T 3 ⚠ | Back Up Trans | LTT35EPSB007 or |
| ⚠ | Back Up Trans EI-35X15 | 115M984 |
| T 4 ⚠ | Switching Trans ETS39K533A | 115N977 |
| AC 1 ⚠ | AC Cord | 5750112 |
| CN 8 | Connector Base 2P RTB-1.5-2V | 1780165 |
| F 1 ⚠ | Fuse T4.00A/250V | 1790998 or |
| ⚠ | Fuse T4.00A/250V | 1790487 |
| PS 1 ⚠ | Posistor | 5790117 |

| REF. NO. | DESCRIPTION | PART NO. |
|---|---|---|
| | Wire Ass'Y CE5400-03 | CE5400-03 or |
| | Heat Sink C | 0EM400379 or |
| | Heat Sink B K42428 | 8S00362 |
| ⚠ | Cord Stoper SR-4N-4 | 1790173 or |
| | Fuse Holder | 1790424 |
| | **CAHSSIS ELECTRICAL PARTS** | |
| L 19 ⚠ | Degaussing Coil | 1120174 |
| SP 1 | Speaker | 1520612 |
| CRT ⚠ | CRT [for HT Type CRT] | 1833133 |
| | CRT [for GS Type CRT] | TCRT190GS004 |
| | CRT [for SAM Type CRT] | TCRT190SM005 |
| | CRT [for CPT Type CRT] | UMNT020CP001 |
| | Wire Ass'y (Main PCB to Speaker) | WX1L7002-006 |
| W 1 | Wire Ass'y (CRT GRU Wire) | CE5201-03 |